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NASA CLIMATE DATA CATALOG

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Goddard Space Flight Center
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NASA

CLIMATE DATA

CATALOG

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FOREWORD

The NASA Climate Data Catalog provides scientific users with technical information about selected climate parameter data sets and the associated sensor measurements from which they were derived. Many of the data sets described in the catalog are products of NASA missions, but several associated NOAA data sets and related ground-based data sets are also described. Data sets described in the catalog contain experimental data for a diverse range of climate parameters extending from upper atmospheric trace constituents to sea air boundary measurements. The catalog seeks to provide a central source of technical material describing the satellite sensor measurements, derived climate parameters and data products available to the climate community.

The catalog was prepared for the National Space Science Data Center of Goddard Space Flight Center in a way which allows it to be dynamic: it is periodically updated and expanded, particularly to describe new climate data sets supported by the Pilot Climate Data System (PCDS), formerly the Pilot Climate Data Base Management System (PCDBMS). The catalog is currently maintained in a computer machine readable representation which can easily be accessed via the PCDS. The National Space Science Data Center does not envision reproducing the entire catalog in hardcopy format because of the volume of information, but will publish a summary report such as the current document from time to time. For information on access to the PCDS, contact Juanita Cleveland, Code 633, Goddard Space Flight Center, Greenbelt, Maryland 20771, telephone 301-344-9498.

This effort has been supported by a number of people, including OAO Corporation personnel and SM Systems and Research Corporation personnel, as well as Goddard personnel and data producers and archivers who aided in gathering the information.

All comments and inquiries concerning the catalog should be addressed to Mary Reph, Code 634, Goddard Space Flight Center, Greenbelt, Maryland 20771, telephone 301-344-9040.

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SECTION 1. CATALOG DESCRIPTION

In order to gain an understanding of and to implement solutions to various technical problems involved in providing unified data management support for selected NASA climate related data, the National Space Science Data Center, Code 630.2, of the NASA Goddard Space Flight Center (GSFC) has implemented the Pilot Climate Data System (PCDS). This system should provide insight into the validity of these solutions via direct interactions between the PCDS and the NASA portion of the climate data user community. It is envisioned that this pilot system will evolve to form a baseline data base management system (DBMS) to which further NASA climate data management support can be added. In concept, the initial thrust of the pilot effort is to provide comprehensive information describing selected NASA climate related data, flexible easy access to data of interest, and delivery of data products in readily usable form. The PCDS, implemented initially with limited climate data coverage, provides a basic capability for later expansion and augmentation. It serves both to demonstrate the feasibility of establishing a centrally managed NASA climate data base and to test developments in evolving a comprehensive capability for providing unified, flexible access to a variety of climate parameter data sets derived from various NASA instruments and sources.

In assessing the requirements for the PCDS, it became apparent that a major problem confronting climate researchers and other potential users of NASA climate-related data is determining what data exist, or are planned which are appropriate to support their research efforts. Typically, each satellite project has its own organization which is responsible for the production of data sets and data products derived from the measurements obtained by the instruments on the satellite. For a variety of reasons, these processing groups may delay the release of data for many months after a satellite has been launched. During this time the data are not available to other potential users. Furthermore, information about the data and the processing status of the data may also not be readily available. The researcher is often forced to use personal contacts to find out about the actual condition of data that may be of benefit to his research effort. Even after the data have been released for general access, the data archive facility may not provide the support services, special retrieval processing, or insight into the nature of the data vis-a-vis their application to a scientific discipline such as climatology. This information is needed by researchers in order to discover what is available and to make informed decisions about the appropriateness of, and any possible problems with, use of the data under consideration.

The catalog deals with both climate parameters and the observations from which they were derived. Typically the data, when on tape, are structured in two different ways, orbit-by-orbit or on world maps. Observations at Level 0 and Level I (see Glossary) reflect the repetitive nature of earth orbits, and tend to be organized on an orbit-by-orbit sequence in order of increasing time. Derived parameters at Level II usually maintain this same structure. Level III data, while often merged to develop maps, at the present stage of the climate data management program are usually at higher resolutions and shorter time periods than many researchers would consider appropriate for "climate data."

The development of a NASA Climate Data Catalog is intended to alleviate these problems for a selected set of NASA climate-related data. A limited number of data sets have been selected for inclusion in this version of the catalog. The catalog will continue to be updated and expanded to incorporate new data sets, to reflect changes in data set status or new information not previously available, and to make other revisions as required in response to user feedback on the usefulness of the catalog.

The data set descriptions which are presented in the catalog are for those climate and radiance data sets which are viewed as being of highest priority to the greatest number of climate researchers within the NASA climate research community, to be of the best quality, to be most readily available (immediately or in the near term), and to be best suited to support the development of a PCDS. The catalog is an evolving document; new data set descriptions will be added, and existing descriptions will be updated to reflect both current conditions and near-term plans.

1.1 CATALOG PURPOSES

The purposes of the catalog are listed below:

a. Provide a single reference document for summarized descriptions of NASA data sets and selected complementary non-NASA data sets which are likely to be of interest to those doing climate research.

b. Provide sufficiently detailed and appropriate information to support researchers in making informed decisions with respect to obtaining particular data sets.

c. Systematically present descriptions in a standard manner so that the characteristics of two or more data sets can be readily compared.

d. Present definitions and examples which can provide guidance in the preparation of new data set descriptions for incorporation into the catalog (or for the preparation of similar catalogs by other organizations or other NASA programs).

e. Provide a document which can be conveniently updated and expanded either in-total (e.g., issue new version) or piecemeal (e.g., issue change or replacement pages or new pages for insertion).

f. Provide baseline data set information needed by the PCDS.

1.2 CATALOG DEVELOPMENT

During FY79, a representative sample of potential users of a NASA climate data management system was surveyed to identify user requirements and priorities for the development of such a system for accessing NASA climate related data sets. The need for a catalog to identify and describe the characteristics and status of climate related data was high among user priorities identified during the survey. The format of such a catalog and priorities relative to data sets which should be initially included in such a catalog were also specified by the survey participants in a general manner.

Following the survey, an analysis was performed which considered factors other than user preferences, such as the availability of various data sets and the quality of the recorded data contained within the data sets. This analysis led to the format and data set entries found in the catalog. These data sets have been selected for coverage in the catalog because they contain data important to climate research, are (or will soon be) available with a significant degree of validation, and provide catalog entries which are representative of the types of data that will be incorporated into the catalog as it grows and expands in the future.

The catalog is organized in a modular manner so that new material can be added, or selected material can be deleted or replaced without requiring a total rewrite of the document. The catalog is intended to be a dynamic document which is subject to periodic revision and update and continued expansion.

1.3 DATA SET DEFINITION

For the purposes of the catalog, the term data set means a group of measurements or derived parameters organized in serial or geographic terms for convenient reference or access. Data sets are divided into those containing radiance measurement data (i.e., Level I data) and those containing derived geophysical or climate parameter data (i.e., Level II and III data). Radiance data sets and parameter data sets are described separately in the catalog. A radiance data set description typically covers all Level I data from a single instrument. A parameter data set description typically covers all Level II and III products for a single parameter derived from a single instrument on one satellite, however, a parameter data set may also include data from a family of several identical or evolving instruments on a series of satellites. By contrast, a single instrument (e.g., with multiple sensing channels) may produce data for several different parameter data sets. An example of a single instrument producing several different types of parameter data sets is the Scanning Multichannel Microwave Radiometer (SMMR).

A data set description covers all types of products, such as computer compatible magnetic tape, film images, and computer-generated graphic products (e.g., contour maps, montages, tables, histograms and other types of graphic presentations) output from the instrument or data processing facility. For each data set identified in the catalog, both a summary description and a detailed description are provided. The summary description is included for purposes of overview orientation and rapid survey of all data sets addressed in the catalog. The detailed description is intended to be used for in-depth examination and evaluation of the characteristics of a particular data set.

1.4 GUIDANCE ON CATALOG USE

Section 1 contains definitions for the items of information presented in the catalog for individual data sets. It also contains information to aid in the use of the catalog as well as for the preparation of future entries to the catalog.

Section 2 provides summarized information about all data sets currently described in the catalog. The intent of this section is to aid in the rapid survey of all data sets in order to select one or more for detailed examination.

Sections 3 and 4 provide sample detailed descriptions for individual data sets or families of related data sets. Section 3 contains a sample description of a climate parameter data set. Section 4 contains a corresponding sample description of a radiance measurement data set. The inclusion of all such descriptions in this document is impractical because of the volume of information available. These descriptions can be accessed via the PCDS, over either computer telephone link or by visiting the Information Management Branch. For information about accessing the PCDS, contact Juanita Cleveland, Code 633, Goddard Space Flight Center, Greenbelt, Maryland 20771, telephone 301-344-9498.

It is suggested that the following procedures be applied in using this catalog:

a. Scan the summary information presented in Section 2 of this document or query the catalog summary via the PCDS to identify data sets of possible interest.

b. Use the PCDS to examine the detailed descriptions of each of the individual climate parameter or radiance measurement data sets of possible interest, noting which data sets of interest are available via PCDS.

c. If further or clarifying information is needed, review the reference documentation listed in the on-line catalog for each data set or consult the individuals listed as possible contacts.

d. If a desired data set is available through PCDS, use PCDS to access, manipulate, and display the data. Otherwise, follow the procedures defined in the on-line catalog for ordering each data set desired.

1.4.1 SUMMARY DESCRIPTIONS FOR DATA SETS

The summary descriptions in Section 2 of this catalog cover both the climate parameter and the source radiance measurement data sets described in more detail in the on-line catalog. They are presented in the form of tabular listings of key information about each data set. An overview of the levels of data available or planned is provided in Section 2, Table 2-1.

Table 1-1 and Table 1-2 illustrate the formats in which the summary description for parameter data sets and radiance data sets respectively are presented. The summary information for each climate parameter data set includes the following items:

a. DATA TYPE: The name of the climate parameter is identified. The processing classification level for the data set is also listed.

Table 1-1. Summary Descriptions For Climate Parameter Data Sets

DATA TYPE	Parameter: Level
SOURCE	Mission: Sensor
SPATIAL	Coverage: Resolution
TEMPORAL	Coverage: Resolution
PRODUCTS	Medium: Quality
ARCHIVE	Name: Status
CATALOG REFERENCE	Notes

Table 1-2. Summary Descriptions For Radiance Measurement Data Sets

DATA TYPE	Spectral Band: Wavelength(s)
SOURCE	Mission: Sensor
SPATIAL	Coverage: Resolution
TEMPORAL	Coverage: Resolution
PRODUCTS	Medium: Quantity
ARCHIVE	Name: Status
CATALOG REFERENCE	Notes

typically Levels II and III (see glossary for definition of data levels). If a particular climate parameter has different instrument sources, separate summary descriptions will usually be presented for each source.

b. SOURCE: The names of the mission(s)/satellite(s) and the sensor(s)/instrument(s) from which the data set is derived are identified.

c. SPATIAL: Spatial coverage and resolution for the data set are defined. The footprint size (for Level II) or grid size (for Level III), as well as profile vertical levels if appropriate, are listed.

d. TEMPORAL: Temporal coverage and resolution for the data set are defined. Data collection start and end dates are listed. In addition, the duty cycle as well as the sampling (for Level II) or averaging (for Level III) time period for the data are explained.

e. PRODUCTS: The medium (tape, film) and number of observations typically recorded per unit of time (e.g., number of observations every 24 hours), or the number of data products (physical units) per unit of time (e.g., number of tapes per year) are listed.

f. ARCHIVE: The name and/or location of the archive or other facility (such as PCDS) from which the data set can be obtained is identified. The quantity of data products actually available is also listed (e.g., 2600 tapes covering 12/72 - 12/75).

g. CATALOG REFERENCE: This column is intended as an aid to finding the corresponding detailed description in the on-line catalog. It includes an abbreviated name for the detailed entry, formed by abbreviating the parameter, level, mission, and sensor names.

For each radiance data set the summary information given is similar to that presented for parameter data sets (e.g., the same major column headings) with a few differences:

a. DATA TYPE: The portion of the electromagnetic spectrum and the wavelength(s) are given for each sensing channel of the instrument. Data included are ordinarily Level 0 and Level 1.

b. SOURCE: (Same as for parameter data set summary descriptions.)

c. SPATIAL: (Same as for Level II parameter data set summary descriptions.)

d. TEMPORAL: (Same as for Level II parameter data set summary descriptions.)

e. PRODUCTS: (Same as for parameter data set summary descriptions.)

f. ARCHIVE: (Same as for parameter data set summary descriptions.)

g. CATALOG REFERENCE: This column is intended as an aid to finding the specific detailed description in Section 4 of the catalog. It includes an abbreviated name for the detailed entry, formed by abbreviating the sensor and mission names.

The purpose of the summary description is only to provide key information to aid in quickly surveying or screening all available data sets in order to select one or more data sets for a more detailed examination and evaluation with respect to a potential user's research data needs. The decision to request and use a data set will typically require examination of the detailed description. The user, however, can eliminate those data sets not appropriate for his specific needs by examining the summary descriptions. The user, thus, only has to direct his attention to the detailed descriptions of those data sets which might possibly meet his information requirements.

To the extent practicable, the summary descriptions are presented as short phrases, single values, or abbreviations, rather than narrative discussions in sentence form. This approach is used so that specific entries can be found, reviewed, and compared at a glance.

1.4.2 DETAILED DESCRIPTIONS FOR DATA SETS

The purpose of the detailed descriptions is to provide the information needed to evaluate the suitability of the data set relative to specific research needs and to make an informed decision about requesting or ordering a particular data set to support these needs. The catalog contains two general types of detailed descriptions: those for data sets of geophysical or climate parameters (a sample is included in Section 3 of this document) and those for the instruments and radiance measurements from which the climate parameters were derived (a sample is included in Section 4 of this document). A parameter data set description may cover data derived from one instrument, or from a series or family of instruments where the data derived from the family forms a continuous (or nearly continuous) set of similar data products over an extended period of time. In reality, the processing and the design of the instruments may have changed during this extended period so that the data set is not homogeneous, but changes with time to reflect altered conditions (e.g., revised formats, processing algorithms, duty cycles, etc.). The occurrence of each significant change is noted.

A radiance data set description covers a specific instrument or instrument series. Generally, but not universally, there is a single detailed instrument data set description corresponding to each parameter data set description.

Table 1-3 provides an outline for the detailed description for individual data sets. The detailed description attempts to be comprehensive and complete, and yet brief and concise in terms of the information presented. As a practical matter, the catalog cannot repeat or duplicate the depth and extent of information included in reference documents. If the discussion or material needed for full coverage of a particular topic or item exceeds a few sentences the material is summarized and referenced rather than repeated. This is especially true with respect to discussions describing data derivation procedures, processing steps, and conversion equations and algorithms which may require many written pages in a reference document. Similarly, specific tape formats may be referenced if the details are too extensive for the purposes of the catalog. There is always a trade-off in a catalog between providing so much detail that the catalog is inconvenient to use, and not enough coverage to provide all needed information.

Table 1-3. Outline of Data Set Detailed Descriptions

1. TYPE OF DATA

   1.1 Parameter/Measurement
   1.2 Unit of Measurement
   1.3 Data Source
   1.4 Data Set Identification

2. SPATIAL CHARACTERISTICS

   2.1 Spatial Coverage
   2.2 Spatial Resolution

3. TEMPORAL CHARACTERISTICS

   3.1 Temporal Coverage
   3.2 Temporal Resolution

4. INSTRUMENT DESCRIPTION

   4.1 Mission Objectives
   4.2 Key Satellite Flight Parameters
   4.3 Principles of Operation
   4.4 Instrument Measurement Geometry

5. DATA PROCESSING SEQUENCE

   5.1 Processing Steps and Data Sets
   5.2 Derivation Techniques/Algorithms
   5.3 Special Corrections/Adjustments
   5.4 Processing Changes

6. QUALITY ASSESSMENT

   6.1 Data Validation by Producer
   6.2 Confidence Level/Accuracy Judgment
   6.3 Usage Guidance

7. CONTACTS FOR DATA PRODUCTION INFORMATION

   Position of Individual (with respect to data production)
      Name
      Organization
      Mailing Address
      Telephone Number

Table 1-3. Outline of Data Set Detailed Descriptions (cont.)

8. OUTPUT PRODUCTS AND AVAILABILITY

    8.1 Tape Products
    8.2 Film Products
    8.3 Other Products
        Name of Data Set
        Medium/Specification
        Format and Content
        Data Quantity/Rate
        Status
        Plans/Schedule

9. DATA ACCESS

    9.1 Archive Identification
    9.2 Procedures for Obtaining Data
    9.3 PCDS Status/Plans

10. CONTACTS FOR ARCHIVE/DATA ACCESS INFORMATION

        Position (with respect to data archiving)
        Name
        Organization
        Mailing Address
        Telephone Number

11. REFERENCES

    11.1 Satellite/Instrument/Data Processing Documentation
    11.2 Journal Articles and Study Reports
    11.3 Archive/DBMS Usage Documentation

12. RELATED DATA SETS

13. SUMMARY/SAMPLE

14. NOTES

The detailed description has specific major headings. The use of a structured systematic format, rather than free-form narrative format for the descriptions, permits cross comparison between data set characteristics as well as a quick review of key points or facts describing a data set. Each item of the detailed description is described below:

TYPE OF DATA (ITEM 1)

The entries under this heading identify the climate parameter or radiance measurements contained in the data set, the mission and sensor which are the source for the data, and other information which specifically identifies and distinguishes this data set from other data sets. Data may come from a single mission and/or sensor, from a series of missions all of which contain the same type of instrument, or from two or more generations of missions and sensors which are improved with each new generation but which are designed to collect the same general types of data.

Parameter/Measurement (1.1): This entry specifies the derived geophysical parameter or the type of radiance measure which is contained in the data set. For a radiance data set, the spectral frequencies/wavelengths that are measured are also listed.

Unit of Measurement (1.2): This entry defines the units of measurement in which data values are presented in output products (e.g., degrees Celsius).

Data Source (1.3): This entry names the missions (satellites) and sensors (instruments) used to record data from which the data set was ultimately derived. For data sets derived from non-satellite sources, the source is identified (e.g., instrument X mounted on aircraft Y). Similar adjustments also have to be made for certain other items in this outline when non-satellite sources are addressed in order to provide information equivalent to that which is given for satellite sources.

Data Set Identification (1.4): This entry presents the title or name of each data set used to identify and distinguish this data set from other data sets. This may be the name (e.g., as on a tape label) of the data product, the name of a specific application computer program that generates the data set, or other identification which uniquely identifies the data set being described. The purpose of this name/title is to minimize ordering errors, mistakes, or misunderstandings between the individual requesting a data set or product and those providing data products. In addition to providing the reference name for the data set, this entry also identifies the processing level(s) for the data set. Level I is used to identify data sets containing calibrated and Earth located radiance measurement derived from raw telemetry observation data. Level II is used to indicate a geophysical parameter data set at highest spatial and temporal resolution. Level III is used to indicate a set containing geophysical parameter data which have been averaged to produce values at a lower spatial and temporal resolution.

SPATIAL CHARACTERISTICS (ITEM 2)

These entries define spatial characteristics which bound and identify where data are recorded (i.e., are potentially available) regardless of whether the data have or have not been fully processed and archived.

Spatial Coverage (2.1): The type of coverage is defined as it relates to the portion of the Earth's surface and atmosphere that are covered by usable recorded instrument readings. For many satellites, except geostationary, this coverage would be the whole Earth. The vertical spatial coverage defines the portion of the atmosphere or profile above the Earth that is measured. For Level I and Level II data the coverage swath is also defined in terms of width, overlap on consecutive orbits, and contiguous nature of the sweep or track pattern. For Level III data the grid pattern or projection is defined.

Spatial Resolution (2.2): For Level I or II data, this entry represents the shape and size of the footprint of the sensor (i.e., field-of-view (FOV)). For Level III data, this is the area or the size of the grid cell over which data are averaged to compute a climate parameter value (e.g., 1 degree X 1 degree latitude and longitude or 100 km square grid) and vertical profile levels, where appropriate.

TEMPORAL CHARACTERISTICS (ITEM 3)

The entries under this heading define the time period and other temporal conditions associated with the data collected. These entries define the time interval over which data are recorded by an instrument, rather than the time period for which products have been produced and archived. The actual time period(s) for processed and archived data products are listed under OUTPUT PRODUCTS AND AVAILABILITY (ITEM 8)

Temporal Coverage (3.1): This entry defines the time interval over which usable data have been recorded. This time interval may be different from the total lifetime or duration of a satellite mission starting with the launch date. (NOTE: These latter time considerations are listed under INSTRUMENT DESCRIPTION (ITEM 4)). Periods of instrument stabilization immediately following turn-on when data are known to be of questionable quality are excluded. Typically, the start and end dates listed are for a period of time beginning shortly after postlaunch instrument check-out and continuing until the on-board instrument fails or is turned off, or the satellite is deactivated or superceded by a newer satellite. Also indicated are time periods when the instrument is, or is not, operating as well as periods of data recording problems or gaps (e.g. due to noise or instrument performance deterioration). In summary, this entry identifies when recorded data are available (independently of whether the data have or have not been processed), when data are not available, and when data are available but of such poor quality that processing is not warranted. This includes an indication of the data gathering duty cycle and day/night recording periods of the instrument.

Temporal Resolution (3.2): This entry defines the time interval represented by each data point. In particular, for Level I or II data this is the data sampling period. For Level III data, it is the time interval over which data are averaged or aggregated. For Level III data, the approximate number of observations contributing to each average value is also included. The revisit or repeat cycle time is also listed. For Level I or II data, this is the time required for one complete spatial coverage cycle. For Level III data, this is the time interval between consecutive data averages for the same

location. Because of the close relationship between temporal resolution and data rates, (or data quantity on a per orbit or per day basis) such information is also included here, where relevant.

INSTRUMENT DESCRIPTION (ITEM 4)

These entries summarize key characteristics of the instrument and satellite and are presented only for radiance data set descriptions. For parameter data sets, the heading is present but the corresponding descriptions presented for the radiance data are referenced rather than repeated.

Mission Objectives (4.1): This includes a brief discussion of the reasons a particular satellite and instrument were developed and results to be accomplished from their flight. If mission objectives were not fully achieved, this is also explained (e.g., instrument failed sooner than expected).

Key Satellite Flight Parameters (4.2): Characteristics which describe the flight of the satellite are listed, including launch date, planned or actual flight duration, orbit altitude and other orbit descriptors (e.g., apogee, perigee, inclination, period, ascending and descending nodal crossing time, longitude for geostationary orbits, etc.).

Principles of Operation (4.3): This entry briefly summarizes the major equipment components of the instrument and their design principles for sensing or techniques used by the instrument. Documentation containing detailed designs, equations or discussions describing how an instrument works are included here by referral to Item 11 (REFERENCES).

Instrument Measurement Geometry (4.4): This entry describes the viewing geometry and angular relationships and orientation of the instrument with respect to the earth.

DATA PROCESSING SEQUENCE (ITEM 5)

These entries describe the major processing steps that are performed to produce the data set and to derive higher level products from it.

Processing Steps and Data Sets (5.1): The processing flow and relationship of data sets are explained under this entry.

Derivation Techniques/Algorithms (5.2): This entry summarizes the processing techniques used to produce the data set from the next lower level data set (e.g., radiance to Level II conversion).

Special Corrections/Adjustments (5.3): Any special corrections, adjustments, or assumed applicable conditions are explained under this heading.

Processing Changes (5.4): Any processing changes that have occurred or are anticipated for future processing are explained here.

QUALITY ASSESSMENT (ITEM 6)

These entries describe the type of testing that is or was performed to assure data quality as well as an evaluation of the accuracy of the data in terms of

design and actual error rates. Specific problems, deficiencies or limitations on the use of the data are also discussed.

Data Validation By Producer (6.1): This entry summarizes the results of pre- and post-launch testing and data evaluation by the data producer (e.g., comparison of flight data with corresponding ground truth measurements). On-going testing and planned future quality control/assurance procedures are also addressed.

Confidence Level or Accuracy Judgment (6.2): This entry summarizes the opinions or comments of those most familiar with the data set with respect to its overall quality as well as specific areas of poor or good quality data for selected portions of the data set. The design accuracy goal for the instrument and resultant end product are defined and contrasted with the actual accuracy being achieved. All known data problems are identified.

Usage Guidance (6.3): Any restrictions, limitations or special warnings about the general or specific use of the data are presented under this heading.

CONTACTS FOR DATA PRODUCTION INFORMATION (ITEM 7)

The entries under this heading provide names and contact information on specific individuals who are familiar with the details concerning the collection and processing of the data set. The same entries are repeated for each individual identified.

Position of Individual: This entry explains what role the individual plays in the data production process. This might be the program or project manager, principal investigator, sensor scientist, or other key member of a group responsible for some aspect of data production.

Name of an Individual: The name of the individual is given.

Organization: This entry names the organization of which the individual is a member.

Mailing Address: This entry contains the current address of the individual.

Telephone Number: This entry contains the current telephone number of the individual.

OUTPUT PRODUCTS AND AVAILABILITY (ITEM 8)

These entries describe current/existing and future/planned data products and the actual and planned quantity of such products. A series of entries is repeated for each type of data product that is archived or is planned. Product descriptions are organized under three types, Tape, Film, and Other.

Type of Product: This title identifies the type of product (e.g., tape, film, etc.).

Name of Data Set: This entry supplies the title or designator by which the particular data set is known during processing or in the archive.

Medium/Specification: This entry specifies the medium (e.g., 7-track, 556-bpi digital magnetic tape, or 35 mm black & white positive slides).

Format and Content: This entry identifies the data elements and their organization or arrangement on each data product. If a detailed format sheet is prepared and shipped with data products, this sheet can be referenced or included in the catalog. The entry should include descriptions or definitions which are adequate for reading and interpreting data products.

Data Quantity/Rate: This entry defines the time interval covered per physical unit (e.g., monthly data tape) and the number of observations per physical unit (e.g., one daily average compiled on a yearly data tape or 365 observations recorded on the tape).

Status: This entry defines the coverage or time period(s) for which data products actually exist and the number of physical units or volume of products in the archive. This entry also defines the rate at which data are being processed and archived (e.g., one monthly data tape reel after a 4 month lag from time of collection).

Plans/Schedule: In contrast with the tabulating of existing products above, this entry lists the volume of products and anticipated production time table for products which are in preparation or are planned for production in the future. If there is a schedule for deleting or purging data products after some period of time, or for adding new products, this inventory control procedure is also explained.

DATA ACCESS (ITEM 9)

These entries provide specific information on where and how to order the data set from an archive.

Archive Identification (9.1): This entry lists the name, address, and telephone number for the archive where the data set is or will be stored. If copies of the data set are stored at two or more locations, all such locations are identified with an indication of which archive has primary responsibility for managing and distributing the data set. Future archives for a data set are also appropriately identified. Other information which would assist in locating a data set within the archive may be included.

Procedures for Obtaining Data (9.2): The procedures for obtaining the data set are explained for each method available (e.g., mailed request, telephone call, computer terminal, etc.). In particular, the following are addressed: access means and options; access steps and rules for each method; information that a requestor should have at hand to expedite the process (e.g., account number, full data set ID, time interval and geographical areas of interest, etc.); and pricing guidance. This item also includes descriptions of special policies or restrictions that help a requestor determine how much it is likely to cost to order the data he wants and what, if any, administrative obstacles he may have in getting the data (e.g., special orders typically require 6 months to process).

PCDS Status/Plans (9.3): This entry describes the availability of the data set through the PCDS. Not all of the data sets described in the catalog are held by PCDS, so this entry notes whether the product is currently available through the PCDS or if any plans for future access are being made.

CONTACTS FOR ARCHIVE OR DATA ACCESS INFORMATION (ITEM 10)

The position title, or area of expertise, name, organization, mailing address, and telephone number of individuals with key responsibilities or knowledge about the operation and/or contents of the archive where the data set is located are listed under this heading. Such individuals are the primary contacts for requesting assistance in obtaining the data. (NOTE: Individuals having detailed knowledge about the quality of the data set or suitable applications for the data are listed under CONTACTS FOR DATA PRODUCTION INFORMATION (ITEM 7)).

REFERENCES (ITEM 11)

These entries list various kinds of documents which can be referenced for more detailed information that can be conveniently included in this catalog. Such documentation is organized under the following categories:

Satellite/Instrument/Data Processing Documentation (11.1)

Journal Articles and Study Reports (11.2)

Archive/DBMS Usage Documentation (11.3)

RELATED DATA SETS (ITEM 12)

This entry includes references to and short descriptions of other data sets related to those described in the catalog.

SUMMARY/SAMPLE (ITEM 13)

This entry presents data summaries and sample outputs so that the catalog reader can get an overview of the data in the data set (e.g., simple statistics such as means, variances, ranges, etc.) and so that the potential data requestor can see (on a limited quantity basis) the form in which he will receive data. Such samples might take the form of plotted contour maps, tables, histograms or other tabular or graphic presentations. An illustration of the format of tape records may also be included. (Note: Typically, documentation describing the tape format will simply be listed under Archive/DBMS Usage Documentation (Item 11.3)).

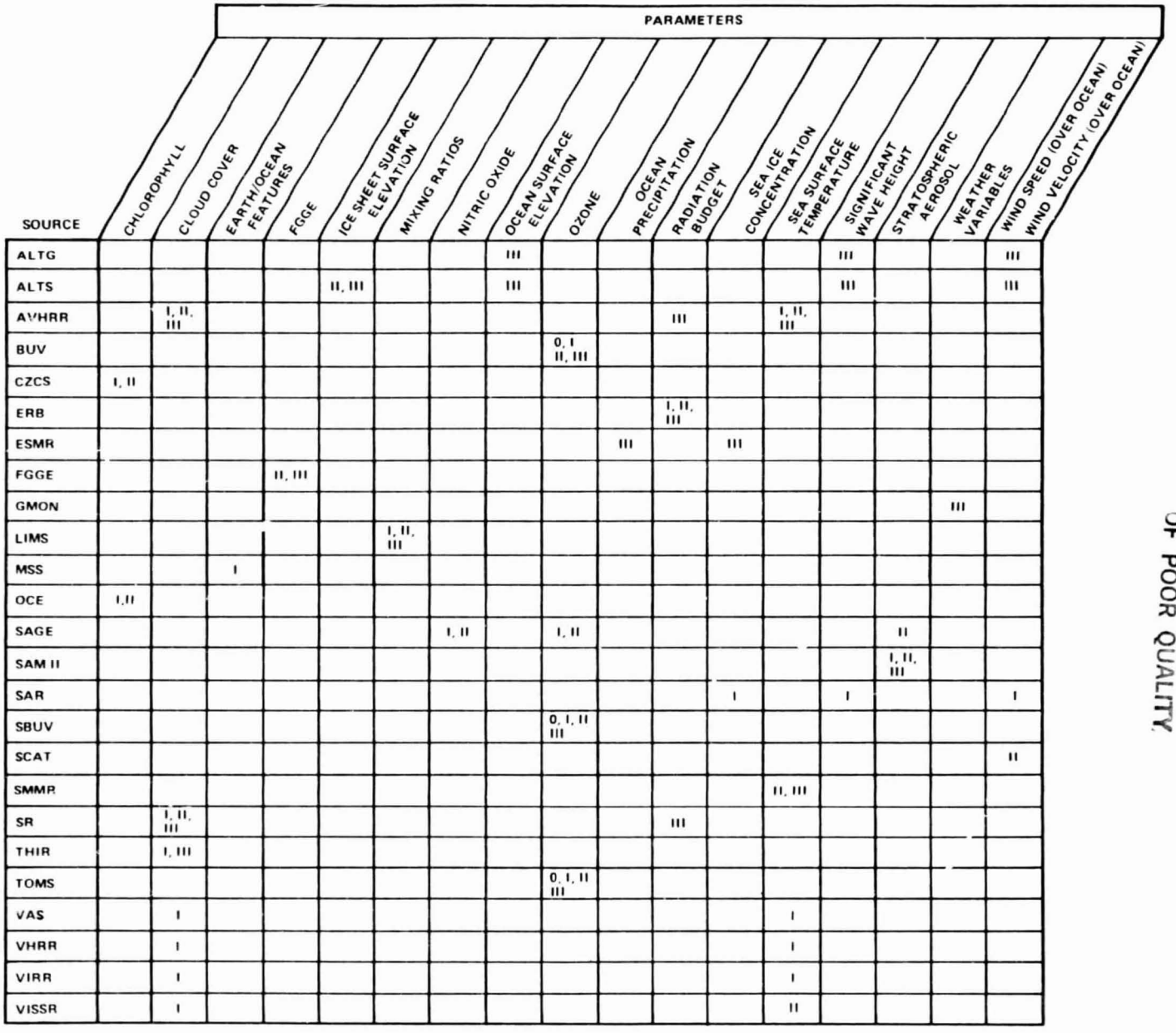
NOTES (ITEM 14)

Information which does not fit under the other headings but is considered important to include in the catalog is listed under this item.

SECTION 2. SUMMARY DESCRIPTIONS

For each climate parameter and source included in this catalog, an overview of the levels of data available, or planned, is provided in Figure 2-1.

For the climate parameter data sets discussed, summary descriptions are given in Table 2-1. Table 2-2 provides summary descriptions of radiance measurement data sets organized in the sequence of the four principal bands in which the measurements were obtained. These highly abbreviated descriptions are intended for quick reference; the reader should use the detailed descriptions in Section 3 and 4 for more complete description of the data set characteristics.



SOURCE	CHLOROPHYLL	CLOUD COVER	EARTH/OCEAN FEATURES	FGGE	ICE SHEET SURFACE ELEVATION	MIXING RATIOS	NITRIC OXIDE	OCEAN SURFACE ELEVATION	OZONE	OCEAN PRECIPITATION	RADIATION BUDGET	SEA ICE CONCENTRATION	SEA SURFACE TEMPERATURE	SIGNIFICANT WAVE HEIGHT	STRATOSPHERIC AEROSOL	WEATHER VARIABLES	WIND SPEED (OVER OCEAN)	WIND VELOCITY (OVER OCEAN)
ALTG								III						III				III
ALTS					II, III			III						III				III
AVHRR		I, II, III									III		I, II, III					
BUV									0, I II, III									
CZCS	I, II																	
ERB											I, II, III							
ESMR										III		III						
FGGE				II, III														
GMON																III		
LIMS						I, II, III												
MSS			I															
OCE	I,II																	
SAGE							I, II		I, II						II			
SAM II															I, II, III			
SAR											I			I				I
SBUV									0, I, II III									
SCAT																		II
SMMR													II, III					
SR		I, II, III									III							
THIR		I, III																
TOMS									0, I, II III									
VAS		I											I					
VHRR		I											I					
VIRR		I											I					
VISSR		I											II					

PARAMETERS

FIGURE 2-1. DATA SET OVERVIEW MATRIX, SHOWING LEVELS OF DATA PLANNED OR PRESENTLY AVAILABLE AND INCLUDED IN THIS CATALOG

Table 2-1. Summary Descriptions for Climate Parameter Data Sets

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
ALBEDO (Earth) Level III	ERB NIMBUS-6	Earth, global; 160km x 160km, 500km x 500km, 4.5deg latitude x 4.5deg longitude, 4.5deg latitude zones and 9deg longitude meridional zones; sun, full disk	07/1975 - 11/1978, Approximately 1 day for global coverage, solar disk viewed 13-15 times daily; daily, 6-day, monthly, & seasonal averages	Tape - Zonal scans tape (ZMT): 2 tapes/1 yr; gridded and mapped data for microfilm production (MATRIX): 12 tapes/1 yr Film - 35mm BW: contour maps of terrestrial flux, albedo, net radiation: approximately 4/wk, 21/month, 19/season; solar constant & insolation table: 1/day; tables of terrestrial flux, albedo, & net radiation: 4/wk, 11/month, 10/season	NSSDC Awaiting additional funding	RB/EN67

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
ALBEDO (Earth) Level III	ERB NIMBUS-7	Earth, global; 160km x 160km, 500km x 500km, 4.5deg latitude x 4.5deg longitude, 4.5deg latitude zones and 9deg longitude meridional zones; sun, full disk	11/1978 - . Approximately 1 day for global coverage, solar disk viewed 13-15 times daily; power on 3 days of 4; daily, 6-day, monthly, and seasonal averages	Tape - Zonal Means Tape (ZMT): 2 tapes/1 yr; gridded and mapped data for microfilm production (ERB-MATRIX): 12 tapes/1 yr; Seasonal Averages (SAVER): 4 tapes/1 year Film - 35mm BW, polar steorographic & Mercator maps of matrix data products (MATRIX-MAPS): 1 set/1 month; solar constant & insolation table (TABLES): 1 set/1 month; seasonally averaged ERB products (SAVER-MAPS): 1 set/1 month	NSSDC/PCDS Three years of MATRIX available; two of other products; MATRIX and ZMT in PCDS	RB/EN67

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
CHLOROPHYLL CONCENTRATION Level II	CZCS NIMBUS-7	Global coastal regions: 825m x 825m	11/1978 - . 6-day repeat cycle: 27.5 msec/observation	Tape - Calibrated Radiance Chlorophyll Sediment Tapes (CRCST): 1000 tapes/3 years Film - 8 x 10 inch negative display of 4 images for each scene showing pigment conc. aerosol radiance. subsurface radiance. and diffuse attenuation (also positive transparency or print available): 6000 pictures/3 yrs.	SDSD Three years of data available	CC/CN
CHLOROPHYLL CONCENTRATION Level II	OCE OSTA-1	Globally distributed coastal regions: 1km x 1km	11/1981 - 11/1981. Duration is 3 days: No repeat coverage	Tape - Relative chlorophyll concentration contour maps: TBD Film - Photographic images. either color or black and white. of the relative chlorophyll concentration within each ocean scene: TBD	NSSDC To be archived	CC/OCE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
CLOUD COVER Level III	THIR NIMBUS-7	Global: 160km x 160km	11/1978 - . 1 day for global coverage: Daily	Tape - Cloud amounts at each of 3 altitude levels for each ERB subtarget area (CLE): 1 tape/5 days: Cloud amounts with improved cloud estimation scheme (NCLE): 1 tape/5 days: Cloud Matrix (C-MATRIX): unknown	NSSDC/PCDS 3 yrs. of CLE available: NCLE & CMATRIX to be archived 1984-86: selected CLE in PCDS	CL/TN7
CLOUDS (Wind Vectors) Level II	VISSR GOES	45deg N to 45deg S: approximately 250km resolution	12/1978 - 11/1979. NESS produced cloud vectors for 0000. 1200. and 1800 GMT	Tape - (additional variables included) Main Level II-b data set: 175 tapes: Level II-b Restructured data subsets (FGGE2B): 93 tapes: Final II-b data set: 175+ tapes Paper - Level II-a inventories	WDC-A & PCDS Some are available. others to be available late 1984	FGGE
GEODETIC HEIGHT (Geopotential Surface) Level III	GMON In situ	Global. 1000mb to 50mb (300mb for RH): Horizontal: 2.5deg x 2.5deg: Vertical: 12 levels to 50mb for ht: 6 levels to 300mb for RH	01/1973 - . Every 12 hours. at 0000Z and 1200Z	Tape - Combined with other weather variables (NMCGRD): 2 tapes/month	NCAR & PCDS Available	WW
GEOPOTENTIAL HEIGHT Level II	GMON In situ	Global. resolution 100km to 200km	01/1731 - 12/1980.	Tape - World Monthly Surface Station Climatology (SSCLIMATE): 1 tape	NCAR & PCDS	WMSSC

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
GEOPOTENTIAL HEIGHT Level III	FGGE Multiple	Global: ECMWF and GFDL provide 1.875deg grids. WMC provides 2.5deg grids; ECMWF provides 15 levels from 100 - 1000mb; GFDL provides 19 levels .4 - 1000mb; WMC provides 12 levels 50 - 1000mb (except for humidity with 6 levels from 300mb)	12/1978 - 11/1979. Usually available for 0000 and 1200 GMT, also available at 0600 and 1800 for Special Observing Periods	Tape - (included with other parameters) WMC Wash Level III-a: 100 tapes; WMC Moscow Level III-a Operational Analyses: 1 tape; WMC Melbourne Level III-a: 23 tapes; GFDL Level III-b: 123 tapes; ECMWF Level III-b (FGGE3B): 82 tapes	WDC-A & PCDS Most are available but ECMWF is reprocessing some data	FGGE
HUMIDITY Level II	GMON In situ	Global, resolution 100km to 200km	01/1731 - 12/1980.	Tape - World Monthly Surface Station Climatology (SSCLIMATE): 1 tape	NCAR & PCDS	WMSSC
HUMIDITY Level II	FGGE Multiple	Global coverage: lateral resolution of 500km for soundings (temperature and wind), surface pressure, humidity and sea temp with a vertical resolution of 7 levels for soundings (4 tropospheric, 3 stratospheric) and 2 dof for humidity	12/1978 - 11/1979. Most are recorded at 0000, 0600, 1200, and 1800 GMT; may vary with data source	Tape - Main Level II-b data set: 15 tapes; Level II-b Restructured data subsets (FGGE2B): 93 tapes in total; Final Level II-b data set: 175 tapes Paper - Level II-a inventories	WDC-A & PCDS Available, except for Final Level II-b data set	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
HUMIDITY (Total Atmospheric Water Vapor) Level II	SMMR NIMBUS-7	Global to 84.2deg latitude: 60km x 60km resolution	12/1978 - 11/1979, 6 days for global coverage: Power on 1 day of 2	Tape - SMMR/FGGE Level II-b Total Atmospheric Water Vapor: 12 tapes	WDC-A & PCDS Available	FGGE
HUMIDITY (Temperature/ Humidity Soundings) Level II	TOVS TIROS-N	Global: 250km resolution	01/1979 - , Orbital period is 102 minutes: 14 orbits/day	Tape - TIROS-N Temperature/Humidity Soundings: 53 tapes	CDAS Available for 1/79 through 1/80	FGGE
HUMIDITY Level III	GMON In situ	Global, 1000mb to 50mb (300mb for RH): Horizontal: 2.5deg x 2.5deg: Vertical: 12 levels to 50mb for ht: 6 levels to 300mb for RH	01/1973 - , Every 12 hours, at 0000Z and 1200Z	Tape - Combined with other weather variables (NMCGRD): 2 tapes/month	NCAR & PCDS Available	WV
HUMIDITY (Relative) Level III	FGGE Multiple	Global: ECMWF and GFDL provide 1.875deg grids, WMC provides 2.5deg grids: ECMWF provides 15 levels from 100 - 1000mb: GFDL provides 19 levels .4 - 1000mb: WMC provides 12 levels 50 - 1000mb (except for humidity with 6 levels from 300mb)	12/1978 - 11/1979, Usually available for 0000 and 1200 GMT, also available at 0600 and 1800 for Special Observing Periods	Tape - (included with other parameters) WMC Wash Level III-a: 100 tapes: WMC Moscow Level III-a Operational Analyses: 1 tape: WMC Melbourne Level III-a: 23 tapes: GFDL Level III-b: 123 tapes: ECMWF Level III-b (FGGE3B): 82 tapes	WDC-A & PCDS Most are available but ECMWF is reprocessing some data	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
ICE-SHEET SURFACE ELEVATION Level II	RADAR ALTM SEASAT	Greenland south of 72deg N and Antarctica north of 72deg S: varies from 500m to 5km	07/1978 - 10/1978. Repeat coverage every 3 days: 10 observations/sec	Tape - Uncorrected ice surface elevations: 4 tapes	NSSDC To be archived	ISSE/AS
ICE-SHEET SURFACE ELEVATION Level III	RADAR ALTM SEASAT	Greenland south of 72deg N and Antarctica north of 72deg S: 25km x 25km	07/1978 - 10/1978. Average over coverage period	Tape - Contour map of ice surface elevations: 1 tape	NSSDC To be archived	ISSE/AS
NITRIC ACID (Mixing Ratio Profiles) Level II	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S: Profiles every 4deg of lat: Vertical: 15 to 64km for ozone, 15-51km for water vapor: 15-40km for nitric acid, & 25-45km for nitrogen dioxide: profile samples at 1.5km intervals	10/1978 - 05/1979. Time increment varies between successive profiles at high & low latitudes: at equator, approx 70 sec and in polar regions approx 200 sec	Tape - Inverted Profile Archival Tape (LAIPAT): 36 tapes, approx 1 tape/2 to 6 days of data	NSSDC LAIPAT available	MR/LN7
NITRIC ACID (Mixing Ratio) Level III	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S	10/1978 - 05/1979. Maps provide monthly and seasonal averages: other products provide averages of several orbits and daily averages	Tape - Map Archival Tapes (LAMAT): 7 tapes. Cross-Section Archival Tape (CAT): approximately 1 tape: Cross-Section Data Matrix Tape (MATRIX-C): approx 14 tapes: Seasonal Map Archival Tapes (LASMAT): approximately 1 tape	NSSDC/PCDS LAMATs & SMATs to be at NSSDC 9/84: LAMATS in PCDS late 1984	MR/LN7

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
NITROGEN DIOXIDE (Vertical Distribution) Level II	SAGE AEM-2	Global from 79deg N to 79deg S, above 10km or cloud tops; Horizontal: 1km x 250km; Vertical: 1km	02/1979 - 11/1981. Full coverage every 18 days	Tape - Nitrogen Dioxide number density and mixing ratio profiles (SAGE-PROF): 1 tape/1 month	NSSDC/PCDS Available	NO2/SA
NITROGEN DIOXIDE (Mixing Ratio Profile) Level II	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S; Profiles every 4deg of lat; Vertical: 15 to 64km for ozone, 15-51km for water vapor; 15-40km for nitric acid, & 25-45km for nitrogen dioxide; profile samples at 1.5km intervals	10/1978 - 05/1979. Time increment varies between successive profiles at high & low latitudes; at equator, approx 70 sec and in polar regions approx 200 sec	Tape - Inverted Profile Archival Tape (LAIPAT): 36 tapes, approx 1 tape/2 to 6 days of data	NSSDC LAIPAT available	MR/LN7
NITROGEN DIOXIDE (Mixing Ratio) Level III	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S	10/1978 - 05/1979. Maps provide monthly and seasonal averages; other products provide averages of several orbits and daily averages	Tape - Map Archival Tapes (LAMAT): 7 tapes; Cross-Section Archival Tape (CAT): approximately 1 tape; Cross-Section Data Matrix Tape (MATRIX-C): approx 14 tapes; Seasonal Map Archival Tapes (LASMAT): approximately 1 tape	NSSDC/PCDS LAMATs & SMATs to be at NSSDC 9/84; LAMATS in PCDS late 1984	MR/LN7
OZONE (Vertical Distribution) Level II	SAGE AEM-2	Global from 79deg N to 79deg S, above cloud tops; Horizontal: 1km x 250km; Vertical: 1km	02/1979 - 11/1981. Full coverage every 18 days	Tape - Ozone number density and mixing ratio profiles (SAGE-PROF): 1 tape/ month	NSSDC/PCDS,WODC Available	OZ/SA

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
OZONE (Total & Vertical Distributions) Level II	BUV NIMBUS-4	Global, 40mb - 0.4mb; horizontal: 200km x 200km, vertical: 2.5km	04/1970 - 05/1977, 6 days for global coverage, daylight only; 32 sec/ observation	Tape - Detailed total ozone (DTOZ): 16 tapes/ 7 yrs; Compressed total ozone (CTOZ): 4 tapes/7 yrs; Detailed profiles with intermediate products (DPFL): 37 tapes/7 yrs; Compressed profiles (CPFL): 4 tapes/7 yrs	NSSDC/PCDS All available at NSSDC; DPFL in PCDS	OZ/BN
OZONE (Mixing Ratio Profiles) Level II	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S; Profiles every 4deg of lat; Vertical: 15 to 64km for ozone, 15-51km for water vapor; 15-40km for nitric acid, & 25-45km for nitrogen dioxide; profile samples at 1.5km intervals	10/1978 - 05/1979, Time increment varies between successive profiles at high & low latitudes; at equator, approx 70 sec and in polar regions approx 200 sec	Tape - Inverted Profile Archival Tape (LAIPAT): 36 tapes, approx 1 tape/2 to 6 days of data	NSSDC LAIPAT available	MR/LN7
OZONE (Total Ozone Content and Ozone Profiles) Level II	SBUV NIMBUS-7	Global, 40mb-0.4mb; Horizontal: 200km x 200km, Vertical: 2.5km	11/1978 - , 6 days for global coverage, power on 3 days of 4, daylight only; 32 sec/ observation	Tape - Total ozone, reflectivity, mixing ratios, & layer ozone amounts, scan by scan and orbit by orbit (HDSBUV or OZONE-S): 1 6250-bpi tape/1 year; Compressed profile ozone tape (CPOZ): 4 1600-bpi tapes/1 year	NSSDC/PCDS Four years of data available; HDSBUV (OZONE-S) in PCDS	OZ/BN

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
OZONE (Total Ozone Content and Ozone profiles) Level II	SBUV NIMBUS-7	Horizontal: global at 200km x 200km, large gaps between orbits at equator (200km wide orbital strips separated by approx 2600km at equator and converging at increasing latitudes); Vertical: 28 to 55km at approx 2km intervals	12/1978 - 11/1979, 6 days for global coverage; Power on 3 days of 4; Daylight only; 32 sec/observation; step-mode only	Tape - SBUV/FGGE Level II-c Ozone (SBUV/FGGE): 12 tapes	WDC-A & PCDS Available	FGGE
OZONE (Total) Level II	TOMS NIMBUS-7	Global; 50km x 50km, varies to 200km x 200km	11/1978 - . 1 day for global coverage, power on 3 days of 4, daylight only; 200 msec/ observation	Tape - Total ozone, reflectivity, & measured radiances (HDTOMS or OZONE-T): 18 6250-bpi tapes/1 year	NSSDC/PCDS Four years of data available; others to be archived in 1985	OZ/BN
OZONE (Total & Vertical Distribution) Level III	BUV NIMBUS-4	Global, 40mb - 0.4mb; horizontal: 10deg latitude zones, vertical: 2.5km	04/1970 - 05/1977, 6 days for global coverage, daylight only; daily averages	Tape - Daily zonal means & profiles geodetic coord (DZP): 1 tape/7 yrs; daily zonal means, geomagnetic coord (DZPM): 1 tape/7 yrs; Gridded monthly mean total ozone: 1 tape/7 yrs; Gridded Monthly Mean ozone profiles: 1 tape/7 yrs	NSSDC/PCDS All available at NSSDC; Daily in PCDS	OZ/BN

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
OZONE (Mixing Ratio) Level III	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S	10/1978 - 05/1979. Maps provide monthly and seasonal averages; other products provide averages of several orbits and daily averages	Tape - Map Archival Tapes (LAMAT): 7 tapes; Cross-Section Archival Tape (CAT): approximately 1 tape; Cross-Section Data Matrix Tape (MATRIX-C): approx 14 tapes; Seasonal Map Archival Tapes (LASMAT): approximately 1 tape	NSSDC/PCDS LAMATs & SMATs to be at NSSDC 9/84; LAMATS in PCDS late 1984	MR/LN7
OZONE (Total & Vertical Distribution) Level III	SBUV NIMBUS-7	Global. 40mb - 0.4mb: horizontal: 10deg latitude zones. 200km x 200km. vertical: 2.5km	11/1978 - . 6 days for global coverage. power on 3 days of 4. daylight only: daily. monthly. & seasonal averages	Tape - Averages of total ozone & mixing ratios (ZMT-T): 1 1600-bpi tape/1 year Film - 16mm BW. orbital cross-section matrices (SBUV-MATRIX): 1 reel per year; tables of zonal means (SBUV-TABLES): 1 reel per year geomagnetic & 1 reel geodetic	NSSDC Two years of data available; others to be archived in 1984	OZ/BN

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
OZONE (Total) Level III	TOMS NIMBUS-7	Global, 40mb - 0.4mb: 5deg latitude zones, 200km x 200km	11/1978 - , 1 day for global coverage, power on 3 days of 4, daylight only; daily, monthly, & seasonal averages	Tape - Zonal means of total ozone (ZMT-T): 1 tape/1 yr; Data for montage: 1 tape/1 wk; daily gridded averages (GRIDTOMS): 1 6250-bpi tape/1 year; daily, monthly, & season averages of total ozone (MATRIX-T): 1 1600-bpi tape/1 year Film - 16mm BW, daily, monthly, seasonal polar stereographic proj of total ozone (TOMS-MATRIX): 1 reel/1 year; 241mm BW, world montage: 1/day; daily, weekly, monthly, & season zonal ave for total ozone (TOMS-TABLES): 1 reel/1 yr	NSSDC Two years of data available; others to be archived in 1984	OZ/BN
PRECIPITATION Level II	GMON In situ	Global, resolution 100km to 200km	01/1731 - 12/1980,	Tape - World Monthly Surface Station Climatology (SSCLIMATE): 1 tape	NCAR & PCDS	WMSSC
PRECIPITATION Level III	GMON In situ	Global, 1000mb to 50mb (300mb for RH); Horizontal: 2.5deg x 2.5deg; Vertical: 12 levels to 50mb for ht; 6 levels to 300mb for RH	01/1973 - , Every 12 hours, at 0000Z and 1200Z	Tape - Combined with other weather variables (NMCGRD): 2 tapes/month	NCAR & PCDS Available	WV

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
PRECIPITATION Level III	ESMR NIMBUS-5	Global oceans: 25km x 25km	12/1972 - 02/1975. Global coverage twice daily; weekly, monthly, seasonal and annual averages	Tape - Weekly, monthly, seasonal and annual average rainfall maps: 2 tapes Film - Microfiche: Weekly, monthly, seasonal and annual average rainfall maps: 6 microfiche	NSSDC Available	P/EN
RADIATION BUDGET Level II	ERB NIMBUS-7	Earth: global; 4.5deg latitude zones for zonally averaged insolation, approx 500km x 500km (World Grid Format) for radiation budget parameters; Sun: full disk; solar diameter	12/1978 - 11/1979. 1 day for global coverage, solar disk veiwed 14 times daily; Power on 3 days of 4; Scanning modes used during 50% of on times while LIMS active	Tape - ERBZ/FGGE Level II-c data set (ERBZ/FGGE): 1 tape; ERBM/FGGE Level II-c data set (ERBM/FGGE): 2 tapes	WDC-A & PCDS Available	FGGE
RADIATION BUDGET Level II	ERB NIMBUS-7	Earth, global; 500km x 500km; sun, full disk	11/1978 - 1980/06. Approximately 1 day for global coverage, solar disk viewed 13-15 time daily; power on 3 days of 4	Tape - Subtarget Radiance Tape (STRT): 4 tapes/1 month	NSSDC 272 days from 11/16/78 to 5/19/80 available of 388 possible	RB/EN67

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
RADIATION BUDGET (Net) Level III	ERB NIMBUS-6	Earth, global; 160km x 160km, 500km x 500km, 4.5deg latitude x 4.5deg longitude, 4.5deg latitude zones and 9deg longitude meridional zones; sun, full disk	07/1975 - 11/1978, Approximately 1 day for global coverage, solar disk viewed 13-15 times daily; daily, 6-day, monthly, & seasonal averages	Tape - Zonal means tape (ZMT): 2 tapes/1 yr; gridded and mapped data for microfilm production (MATRIX): 12 tapes/1 yr Film - 35mm BW: contour maps of terrestrial flux, albedo, net radiation: approximately 4/wk, 21/month, 19/season; solar constant & insolation table: 1/day; tables of terrestrial flux, albedo, & net radiation: 4/wk, 11/month, 10/season	NSSDC Awaiting additional funding	RB/EN67

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
RADIATION BUDGET (Net) Level III	ERB NIMBUS-7	Earth, global; 160km x 160km, 500km x 500km, 4.5deg latitude x 4.5deg longitude, 4.5deg latitude zones and 9deg longitude meridional zones; sun, full disk	11/1978 - , approximately 1 day for global coverage, solar disk viewed 13-15 times daily; power on 3 days of 4; daily, 5-day, monthly, and seasonal averages	Tape - Zonal Means Tape (ZMT): 2 tapes/1 yr; gridded and mapped data for microfilm production (ERB-MATRIX): 12 tapes/1 yr; Seasonal Averages (SAVER): 4 tapes/1 year Film - 35mm BW, polar steorographic & Mercator maps of matrix data products (MATRIX-MAPS): 1 set/1 month; solar constant & insolation table (TABLES): 1 set/1 month; seasonally averaged ERB products (SAVER-MAPS): 1 set / month	NSSDC/PCDS Three years of MATRIX available; two of SAVER; MATRIX in PCDS	RB/EN67
RADIATION BUDGET Level III	SR NOAA-3	Global; 125km x 125km NMC Polar Sterographic grid, 2.5deg x 2.5deg lat/long Mercator map	06/1974 - 12/1974, 14.3 orbits/day	Tape - Daily Heat Budget Products (NOAA-HB): 4 tapes/yr; Monthly Means: 1 tape/1 yr	SDSD & PCDS Available	HB/NOAA
RADIATION BUDGET Level III	SR NOAA-4	Global; 125km x 125km NMC Polar Sterographic grid, 2.5deg x 2.5deg lat/long Mercator map	12/1974 - 09/1976, 14.3 orbits/day	Tape - Daily Heat Budget Products (NOAA-HB): 4 tapes/1 yr; Monthly Means: 1 tape/ yr	SDSD & PCDS Available	HB/NOAA

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
RADIATION BUDGET Level III	SR NOAA-5	Global; 125km x 125km NMC Polar Sterographic grid. 2.5deg x 2.5deg lat/long Mercator map	09/1976 - 02/1978. 14.3 orbits/day	Tape - Daily Heat Budget Products (NOAA-HB): 4 tapes/ yr: Monthly Means: 1 tape/ yr	SDSD & PCDS Available	HB/NOAA
RADIATION BUDGET Level III	AVHRR NOAA-6	Global; 125km x 125km NMC Polar Sterographic grid. 2.5deg x 2.5deg lat/long Mercator map.	06/1979 - . 14.3 orbits/day	Tape - Daily Heat Budget Products (NOAA-HB): 4 tapes/ yr: Monthly Means: 1 tape/ yr	SDSD & PCDS Available	HB/NOAA
RADIATION BUDGET Level III	AVHRR NOAA-7	Global; 125km x 125km NMC Polar Sterographic grid. 2.5deg x 2.5deg lat/long Mercator map	06/1981 - . 14.3 orbits/day	Tape - Daily Heat Budget Prc ucts (NOAA-HB): 4 tapes/ yr: Monthly Means: 1 tape/1 yr	SDSD & PCDS Available	HB/NOAA
RADIATION BUDGET Level III	AVHRR TIROS-N	Global; 125km x 125km NMC Polar Sterographic grid. 2.5deg x 2.5deg lat/long Mercator map	01/1979 - . 14.3 orbits/day	Tape - Daily Heat Budget Products (NOAA-HB): 4 tapes/ yr: Monthly Means: 1 tape/1 yr	SDSD & PCDS Available	HB/NOAA
SEA ICE (Concentration) Level II	SMMR NIMBUS-7	Cells above minimum sea ice latitude (approx 50deg) only. along orbital swath. gaps between orbits at equator (780km wide orbital swaths separated by approx 2000km at equator and converging at increasing latitudes); 30km x 30km	12/1978 - 11/1979. Power on 1 day of 2; near global coverage (above 50 Deg) in 3 days	Tape - SMMR/FGGE Level II-c Sea Ice Concentration: 13 tapes	WDC-A & PCDS Available	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SEA ICE Level III	ESMR NIMBUS-5	Polar regions to 50deg latitude: 2.5deg x 2.5deg	12/1972 - 12/1977. 12 hours for complete coverage: 3-day average	Tape - Mapped sea ice concen of Arctic. 3-day averages: 1 tape/1 yr: mapped sea ice concentration of antarctic. 1- & 3-day averages: 2 tapes/1 yr: mapped sea ice concen. monthly. seasonal & annual variation: 2 tapes/5 yrs	NSSDC/PCDS To be archived 1984	SI/EN56
SEA ICE Level III	ESMR NIMBUS-6	Polar regions to 50deg latitude: 2.5deg x 2.5deg	06/1975 - 12/1977. 12 hours for complete coverage: 3-day average	Tape - Mapped sea ice concentration of Arctic. 3-day averages: 1 tape/ 1 yr: mapped sea ice concentration of Antarctic. 1- & 3-day averages: 2 tapes/ 1 yr: mapped sea ice concentration. monthly. seasonal & annual variation: 2 tapes/5 yrs	NSSDC To be archived	SI/EN56
SEA SURFACE ELEVATION Level III	RADAR ALTM GEOS-3	Global oceans between 65deg N and 65deg S. excluding some areas of the South Atlantic and Indian oceans: Avg: 10km x 10km	04/1975 - 12/1978. Repeat coverage every 4 weeks: 10 observations/ sec: 1 observation/1 sec averages	Tape - Sea surface elevation and other geophysical parameters (SDR.GDR): 131 tapes (10 obs/sec). 11 tapes (1 obs/sec)	SDSD Available	OSE/AG

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SEA SURFACE ELEVATION Level III	RADAR ALTM SEASAT	Global oceans between 72deg N and 72deg S: Avg: 6km x 6km	07/1978 - 10/1978. Repeat coverage every 3 days: 10 observations/sec	Tape - Sea surface elevation and other geophysical parameters (M-tape, I-tape, & G-tape): 100 tapes	SDSD Available	OSE/AS
SEA SURFACE TEMPERATURE Level II	VISSR GOES-1,2,3,4	Pole-to-pole from 5deg W to 145deg W or 65deg W to 155deg E: 8km x 8km	07/1974 - . Full coverage is obtained every half-hour.	Tape - Imagery of IR temperatures in several formats: 1-3 tapes/day Film - Imagery of IR temperatures in several formats: 90/day	SDSD Available	SST/VSG
SEA SURFACE TEMPERATURE Level II	GMON In situ	Global, resolution 100km to 200km	01/1731 - 12/1980.	Tape - World Monthly Surface Station Climatology (SSCLIMATE): 1 tape	NCAR & PCDS	WMSSC
SEA SURFACE TEMPERATURE Level II	FGGE Multiple	Global coverage: lateral resolution of 500km for soundings (temperature and wind), surface pressure, humidity and sea temp with a vertical resolution of 7 levels for soundings (4 tropospheric, 3 stratospheric) and 2 dof for humidity	12/1978 - 11/1979. Most are recorded at 0000, 0600, 1200, and 1800 GMT; may vary with data source	Tape - Main Level II-b data set: 175 tapes; Level II-b Restructured data subsets (FGGE2B): 93 tapes in total; Final Level II-b data set: 175 tapes Paper - Level II-a inventories	WDC-A & PCDS Available, except for Final Level II-b data set	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SEA SURFACE TEMPERATURE Level II	SMMR NIMBUS-7	Global to 84.2deg latitude; 156km x 156km	11/1978 - , 6 days for global coverage, power on 1 day of 2; 24 sec/ observation	Tape - Land/ocean parameters (PARM-LO): 31 tapes/1 yr	NSSDC Two years available	SST/SN
SEA SURFACE TEMPERATURE Level II	SMMR NIMBUS-7	Global to 84.2deg latitude; 156km x 156km	12/1978 - 11/1979. 6 days for global coverage; power on 1 day of 2	Tape - SMMR/FGGE Level II-b Sea Surface Temperature: 4 tapes	WDC-A & PCDS Available	FGGE
SEA SURFACE TEMPERATURE Level II	VISSR SMS-1,2	Pole-to-pole from 5deg W to 145deg W or 65deg W to 155deg E: 8km x 8km	07/1974 - , Full coverage is obtained every half-hour.	Tape - Imagery of IR temperatures in several formats: 1-3 tapes/day Film - Imagery of IR temperatures in several formats: 90/day	SDSD Available	SST/VSG
SEA SURFACE TEMPERATURE Level II	AVHRR TIROS-N	Global: 50km resolution	01/1979 - 11/1979. 1 day for global coverage	Tape - (additional variables included) Main Level II-b data set: 175 tapes; Level II-b Restructured data subsets (FGGE2B): 93 tapes; Final II-b data set: 175 tapes Paper - Level II-a inventories	WDC-A & PCDS Available, except for Final Level II-b data set	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SEA SURFACE TEMPERATURE Level III	SMMR NIMBUS-7	Global to 84.2deg latitude; 156km x 156km	11/1978 - . 6 days for global coverage, power on 1 day of 2; 6-day & 30-day averages	Tape - Mapped land/ocean data (MAP-LO): 1 tape/1 month; mapped sea ice with surface temperature (MAP-SS): 1 tape/1 months Film - 105mm color film available as 9.5" x 9.5" color prints. Mercator maps, 64deg N to 64deg S of land/ocean parms (MATRIX-LO): 1/6 days & 1/month; polar maps, 90deg to 50deg of sea ice/ice sheet parms (MATRIX-SS): 1/6 days & 1/month	NSSDC Two years available; others to be archived in 1984-1985	SST/SN
SEA SURFACE TEMPERATURE Level III	AVHRR NOAA-6	Global oceans from 70deg N to 70deg S: 0.5deg x 0.5deg, 1deg x 1deg, 2.5deg x 2.5deg, 5deg x 5deg	06/1979 - . 1 day for global coverage; field anaylyses are produced daily, weekly, and monthly	Tape - Sea surface temperature observations: 1 tape/ 1 wk; SST analyzed fields: 1 tape/15 days (1deg), 1 tape/1 month (.5 and 5deg), 1 tape/1 year (2.5deg) Paper - 8" x 10" BW: contour charts of global SST data: 1 set/wk	SDSD Available	SST/A

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SEA SURFACE TEMPERATURE Level III	AVHRR NOAA-7	Global oceans from 70deg N to 70deg S: 0.5deg x 0.5deg, 1deg x 1deg, 2.5deg x 2.5deg, 5deg x 5deg	05/1981 - , 1 day for global coverage: field anaylsees are produced daily, weekly, and monthly	Tape - Sea surface temperature observations: 1 tape/1 wk: SST analyzed fields: 1 tape/15 days (1deg), 1 tape/1 month (.5 and 5deg), 1 tape/1 year (2.5deg) Paper - 8" x 10" BW: contour charts of global SST data: 1 set/wk	SDSD Available	SST/A
SEA SURFACE TEMPERATURE Level III	AVHRR TIROS-N	Global oceans 70deg N to 70deg S: 0.5deg x 0.5deg, 1deg x 1deg, 2.5deg x 2.5deg, 5deg x 5deg	01/1979 - , 1 day for global coverage: field analysees are produced daily, weekly, and monthly	Tape - Sea surface temperature observations: 1 tape/1 wk: SST analyzed fields: 1 tape/15 days (1deg), 1 tape/1 month (.5 and 5deg), 1 tape/1 year (2.5deg) Paper - 8" x 10" BW: contour charts of global SST data: 1 set/wk	SDSD Available	SST/A
SNOW COVERAGE BOUNDARY Level III	GMON In setu	Global, 1000mb to 50mb (300mb for RH): Horizontal, 2.5deg x 2.5deg: Vertical: 12 levels to 50mb for ht: 6 levels to 300mb for RH	01/1973 - , Every 12 houre, at 0000Z and 1200Z	Tape - Comb ned with other weather variables (NMCGRD): 2 tapes/month	NCAR & PCDS Available	WV

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SOLAR FLUX Level III	ERB NIMBUS-6	Earth, global; 160km x 160km, 500km x 500km, 4.5deg latitude x 4.5deg longitude, 4.5deg latitude zones and 9deg longitude meridional zones; sun, full disk	07/1975 - 11/1978, Approximately 1 day for global coverage, solar disk viewed 13-15 times daily; daily, 6-day, monthly, & seasonal averages	Tape - Zonal means tape (ZMT): 2 tapes/1 yr; gridded and mapped data for microfilm production (MATRIX): 12 tapes/1 yr Film - 35mm BW: contour maps of terrestrial flux, albedo, net radiation: approximately 4/wk, 11/month, 19/season; solar constant & insolation table: 1/day; tables of terrestrial flux, albedo, & net radiation: 4/wk, 11/month, 10/season	NSSDC Awaiting additional funding	RB/EN67

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SOLAR FLUX Level III	ERB NIMBUS-7	Earth, global; 160km x 160km, 500km x 500km, 4.5deg latitude x 4.5deg longitude, 4.5deg latitude zones and 9deg longitude meridional zones; sun, full disk	12/1978 - , approximately 1 day for global coverage, solar disk viewed 13-15 times daily; power on 3 days of 4; daily, 6-day, monthly, and seasonal averages	Tape - Zonal Means Tape (ZMT): 2 tapes/1 yr; gridded and mapped data for microfilm production (ERB-MATRIX): 12 tapes/1 yr; Seasonal Averages (SAVER): 4 tapes/1 year Film - 35mm BW, polar steorographic & Mercator maps of matrix data products (MATRIX-MAPS): 1 set/1 month; solar constant & insolation table (TABLES): 1 set/1 month; seasonally averaged ERB products (SAVER-MAPS): 1 set/1 month	NSSDC/PCDS Three years of MATRIX available; two of SAVER; MATRIX in PCDS	RB/EN67
SOLAR ULTRAVIOLET FLUX Level II	SBUV NIMBUS-7	Full solar disk, UV; solar diameter	11/1978 - , Solar disk viewed once daily, power on 3 days of 4; 112 sec/ observation & 200 msec/ observation; monthly averages	Film - 16mm BW; tables of solar irradiance; 1/day & 1/month; Plots of solar UV flux, terrestrial UV flux, and UV albedo; 3/month (SBUV SOLAR PARAMETERS)	NSSDC Available	OZ/BN
SOLAR ULTRAVIOLET FLUX Level II	TOMS NIMBUS-7	Full solar disk, UV; solar diameter	11/1978 - , Solar disk viewed once daily, power on 3 days of 4; 112 sec/ observation & 200 msec/ observation; monthly averages	Film - 16mm BW; tables of solar irradiance; 1/1 day & 1/month plots of solar UV flux, terrestrial UV flux, and UV albedo; 3/month (TOMS SOLAR PARAMETERS)	NSSDC Two years available	OZ/BN

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SOLAR ULTRAVIOLET FLUX Level III	SBUV NIMBUS-7	Full solar disk, UV: solar diameter	11/1978 - , Solar disk viewed once daily, power on 3 days of 4: 112 sec/ observation & 200 msec/ observation: monthly averages	Film - 16mm BW: tables of solar irradiance: 1/day & 1/month: Plots of solar UV flux, terrestrial UV flux, and UV albedo: 3/month (SBUV SOLAR PARAMETERS)	NSSDC Two years available	OZ/BN
SOLAR ULTRAVIOLET FLUX Level III	TOMS NIMBUS-7	Full solar disk, UV: solar diameter	11/1978 - , Solar disk viewed once daily, power on 3 days of 4: 112 sec/ observation & 200 msec/ observation: monthly averages	Film - 16mm BW: tables of solar irradiance: 1/1 day & 1/month plots of solar UV flux, terrestrial UV flux, and UV albedo: 3/month (TOMS SOLAR PARAMETERS)	NSSDC Two years available	OZ/BN
STRAT AEROSOLS OPTICAL DEPTH Level II	SAGE AEM-2	Global from 79deg N to 79deg S, above cloud tops: Horizontal: 1km x 250km: Vertical: 1km	02/1979 - 11/1981. Full coverage is obtained in 18 days.	Tape - Aerosol extinction vertical profiles: 1 tape/1 month	NSSDC Available	SA/SSN7
STRAT AEROSOLS OPTICAL DEPTH Level II	SAM-2 NIMBUS-7	Global from 64deg N to 80deg N and from 64deg S to 80deg S: Horizontal: 1km x 250km: Vertical: 1km	10/1978 - , Full latitude coverage is obtained in 3 months	Tape - Beta and Aerosol Number Density Archival Tapes (BANAT): 1 tape/1 month	NSSDC/PCDS Four years available	SA/SSN7

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
STRAT AEROSOLS OPTICAL DEPTH Level III	SAM-2 NIMBUS-7	Global from 64deg N to 80deg N and from 64deg S to 80deg S: Horizontal: 1km x 250km: Vertical: 1km	10/1978 - . Full latitude coverage is obtained in 3 months	Tape - Aerosol extinction profiles and optical depth, contour maps, cross sections and time history plots: 16 tapes/year Film - 16 mm, Aerosol extinction, number density and optical depth profiles, contour maps, cross sections and time history plots (PROFILE): 12 reels/1 year: seasonally averaged data (MATRIX): 4 reels/1 year	NSSDC Two years available	SA/SSN7
SURFACE PRESSURE Level II	GMON In situ	Global, resolution 100km to 200km	01/1731 - 12/1980.	Tape - World Monthly Surface Station Climatology (SSCLIMATE): 1 tape	NCAR & PCDS	WMSSC
SURFACE PRESSURE Level II	FGGE Multiple	Global coverage: lateral resolution of 500km for soundings (temperature and wind), surface pressure, humidity and sea temp with a vertical resolution of 7 levels for soundings (4 tropospheric, 3 stratospheric) and 2 dof for humidity	12/1978 - 11/1979. Most are recorded at 0000, 0600, 1200, and 1800 GMT: may vary with data source	Tape - Main Level II-b data set: 175 tapes: Level II-b Restructured data subsets (FGGE2B): 93 tapes in total: Final Level II-b data set: 175 tapes Paper - Level II-a inventories	WDC-A & PCDS Available, except for Final Level II-b data set	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
SURFACE PRESSURE Level III	GMON In situ	Global, 1000mb to 50mb (300mb for RH): Horizontal: 2.5deg x 2.5deg; Vertical: 12 levels to 50mb for ht; 6 levels to 300mb for RH	01/1973 - , Every 12 hours, at 0000Z and 1200Z	Tape - Combined with other weather variables (NMCGRD): 2 tapes month	NCAR & PCDS Available	WV
SURFACE PRESSURE (Mean Surface Level) Level III	FGGE Multiple	Global; ECMWF and GFDL provide 1.875deg grids, WMC provides 2.5deg grids; ECMWF provides 15 levels from 100 - 1000mb; GFDL provides 19 levels .4 - 1000mb; WMC provides 12 levels 50 - 1000mb (except for humidity with 6 levels from 300mb)	12/1978 - 11/1979, Usually available for 0000 and 12000 GMT, also available at 0600 and 1800 for Special Observing Periods	Tape - (included with other parameters) WMC Wash Level III-a: 100 tapes; WMC Moscow Level III-a Operational Analyses: 1 tape; WMC Melbourne Level III-a: 23 tapes; GFDL Level III-b: 123 tapes; ECMWF Level III-b (FGGE3B): 82 tapes	WDC-A & PCDS Most are available but ECMWF is reprocessing some data	FGGE
SURFACE TEMPERATURE Level III	GMON In situ	Global, 1000mb to 50mb (300mb for RH): Horizontal: 2.5deg x 2.5deg; Vertical: 12 levels to 50mb for ht; 6 levels to 300mb for RH	01/1973 - , Every 12 hours, at 0000Z and 1200Z	Tape - Combined with other weather variables (NMCGRD): 2 tapes/month	NCAR & PCDS Available	WV

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
TEMPERATURE PROFILE Level II	FGGE Multiple	Global coverage: lateral resolution of 500km for soundings (temperature and wind), surface pressure, humidity and sea temp with a vertical resolution of 7 levels for soundings (4 tropospheric, 3 stratospheric) and 2 dof for humidity	12/1978 - 12/1979. Most are recorded at 0000, 0600, 1200, and 1800 GMT; may vary with data source	Tape - Main Level II-b data set: 175 tapes; Level II-b Restructured data subsets (FGGE2B): 93 tapes in total; Final Level II-b data set: 175 tapes Paper - Level II-a inventories	WDC-A & PCDS Available, except for Final Level II-b data set	FGGE
TEMPERATURE PROFILE (Stratospheric) Level II	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S at approx 4deg intervals along limb of the satellite track; Vertical: 10-52km at approx 1.5km intervals	12/1978 - 05/1979. Effective 62% on-duty cycle due to mechanical interference with ERB; once every 48 seconds	Tape - LIMS/FGGE Level II-b Stratospher Temp Profiles (LIMS/FGGE): 8 tapes; (included with other parameters on the following data sets) Main II-b: 175 tapes; Level II-b Restructured: 93 tapes (FGGE2B); Final Level II-b: 175+ tapes	WDC-A & PCDS Newest version available at WDC-A; PCDS has version 1 only	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
TEMPERATURE PROFILE (Stratospheric) Level II	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S; profiles every 4deg of lat; Vertical: Temperature profile boundaries from 15 to 64km on average; profile samples at 1.5km intervals	10/1978 - 05/1979. Time increment varies beteen successive profiles at high and low latitudes; at equator approx 70 sec and in polar regions approx 200 sec	Tape - Inverted Profile Archival Tapes (LAIPAT): 36 tapes. approx 1tape/2 to 6 days; Inverted Profiles and Radiance Tapes (PROFILE-I): approximately 7 tapes	NSSDC LAIPAT available	MR/LN7
TEMPERATURE PROFILE Level III	FGGE Multiple	Global: ECMWF and GFDL provide 1.875deg grids. WMC provides 2.5deg grids; ECMWF provides 15 levels from 100 - 1000mb; GFDL provides 19 levels .4 - 1000mb; WMC provides 12 levels 50 - 1000mb (except for humidity with 6 levels from 300mb)	12/1978 - 11/1979. Usually available for 0000 and 1200 GMT, also available at 0600 and 1800 for Special Observing Periods	Tape - (included with other parameters) WMC Wash Level III-a: 100 tapes; WMC Moscow Level III-a Operational Analyses: 1 tape; WMC Melbourne Level III-a: 23 tapes; GFDL Level III-b: 123 tapes; ECMWF Level III-b (FGGE3B): 82 tapes	WDC-A & PCDS Most are available but ECMWF is reprocessing some data	FGGE

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
WATER VAPOR (Mixing Ratio Profiles) Level II	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S; Profiles every 4deg of lat: Vertical: 15 to 64km for ozone. 15-51km for water vapor; 15-40km for nitric acid. & 25-45km for nitrogen dioxide; profile samples at 1.5km intervals	10/1978 - 05/1979. Time increment varies between successive profiles at high & low latitudes; at equator, approx 70 sec and in polar regions approx 200 sec	Tape - Inverted Profile Archival Tape (LAIPAT): 36 tapes, approx 1 tape/2 to 6 days of data	NSSDC LAIPAT available	MR/LN7
WATER VAPOR (Mixing Ratio) Level III	LIMS NIMBUS-7	Horizontal: 84deg N to 64deg S	10/1978 - 05/1979. Maps provide monthly and seasonal averages; other products provide averages of several orbits and daily averages	Tape - Map Archival Tapes (LAMAT): 7 tapes; Cross-Section Archival Tape (CAT): approximately 1 tape; Cross-Section Data Matrix Tape (MATRIX-C): approx 14 tapes; Seasonal Map Archival Tapes (LASMAT): approximately 1 tape	NSSDC/PCDS LAMATs & SMATs to be at NSSDC 9/84; LAMATS in PCDS late 1984	MR/LN7
WAVE HEIGHT Level III	RADAR ALTM GEOS-3	Global oceans between 65deg N and 65deg S, excluding some areas of the South Atlantic and Indian oceans; Avg: 10km x 20km	04/1975 - 12/1978. Repeat coverage every 4 weeks; 1 observation/2 secs	Tape - Significant wave height and other geophysical parameters (I-tape, G-tape, M-tape): 11 tapes	SDSD Available	SWH/ALTG

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
WAVE HEIGHT Level III	RADAR ALTM SEASAT	Global oceans between 72deg N and 72deg S: Avg: 6km x 6km	07/1978 - 10/1978. Repeat coverage every 3 days: 10 observations/sec	Tape - Significant wave height and other geophysical parameters (I-tape, G-tape, M-tape): 100 tapes	SDSD Available	SWH/ALTS
WIND VELOCITY Level II	FGGE Multiple	Global coverage: lateral resolution of 500km for soundings (temperature and wind), surface pressure, humidity and sea temp with a vertical resolution of 7 levels for soundings (4 tropospheric, 3 stratospheric) and 2 dof for humidity	12/1978 - 12/1979. Most are recorded at 0000, 0600, 1200, and 1800 GMT: may vary with data source	Tape - Main Level II-b data set: 175 tapes: Level II-b Restructured data subsets (FGGE2B): 93 tapes in total: Final Level II-b data set: 175 tapes Paper - Level II-a inventories	WDC-A & PCDS Available, except for Final Level II-b data set	FGGE
WIND VELOCITY (Sea Surface Wind Speed) Level II	SMMR NIMBUS-7	64deg N to 64deg S: 97.5km x 97.5km	12/1978 - 11/1979. 6 days for global coverage: Power on 1 day of 2	Tape - SMMR/FGGE Level II-b Sea Surface Wind Speed: 30 tapes	WDC-A & PCDS Plans cancelled	FGGE
WIND VELOCITY Level II	SCATTEROM SEASAT	Global oceans between 78deg N and 78deg S: Avg: 50km x 50km	07/1978 - 10/1978. Repeat coverage every 3 days	Tape - Ocean surface wind vectors and explanatory text: 50 tapes	SDSD Available	WV/SS

Table 2-1. Summary Descriptions for Climate Parameter Data Sets (cont.)

DATA TYPE Parameter Level	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
WIND VELOCITY (SCALAR) Level III	RADAR ALTM GEOS-3	Global oceans between 65deg N and 65deg S excluding some areas of the South Atlantic and Indian oceans: Avg: 10km x 20km	04/1975 - 12/1978. Repeat coverage every 4 weeks: 1 observation/2 secs	Tape - Ocean wind speed and other geophysical parameters: 11 tapes	SDSD Available	WV/AG
WIND VELOCITY Level III	GMON In situ	Global. 1000mb to 50mb (300mb for RH): Horizontal: 2.5deg x 2.5deg; Vertical: 12 levels to 50mb for ht; 6 levels to 300mb for RH	01/1973 - . Every 12 hours. at 0000Z and 1200Z	Tape - Combined with other weather variables (NMCGRD): 2 tapes/month	NCAR & PCDS Available	WV
WIND VELOCITY (Horizontal Wind Components and Vertical Velocity) Level III	FGGE Multiple	Global: ECMWF and GFDL provide 1.875deg grids. WMC provides 2.5deg grids: ECMWF provides 15 levels from 100 - 1000mb: GFDL provides 19 levels .4 - 1000mb: WMC provides 12 levels 50 - 1000mb (except for humidity with 6 levels from 300mb)	12/1978 - 11/1979. Usually available for 0000 and 12000 GMT. also available at 0600 and 1800 for Special Observing Periods	Tape - (included with other parameters) WMC Wash Level III-a: 100 tapes: WMC Moscow Level III-a Operational Analyses: 1 tape: WMC Melbourne Level III-a: 23 tapes: GFDL Level III-b: 123 tapes: ECMWF Level III-b (FGGE3B): 82 tapes	WDC-A & PCDS Most are available but ECMWF is reprocessing some data	FGGE
WIND VELOCITY (Scalar) Level III	RADAR ALTM SEASAT	Global oceans between 72deg N and 72deg S: Avg: 6km x 6km	07/1978 - 10/1978. Repeat coverage every 3 days: 10 observations/sec	Tape - Ocean wind speed and other geophysical parameters: 100 tapes	SDSD Available	WV/AS

END OF REPORT

Table 2-2. Summary Descriptions for Radiance Data Sets

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
IR Six spectral regions: 13.2 to 17.3; 14.9 to 15.7; 10.9 to 11.8; 8.8 to 10.8; 6.4 to 7.3; 6.1 to 5.4 micrometers	LIMS NIMBUS-7	Horizontal: 84deg to 64deg S; Profiles every 4deg of lat; Vertical: 15 to 64km for ozone and CO2, 15 to 51km for water vapor, 15 to 40km for nitric acid and 25 to 45km for NO2; Profile samples at 1.5km intervals	10/1978 - 05/1979. Time increment varies between successive profiles at high and low latitudes; at equator approx 70 sec and in polar regions approx 200 sec	Tape - Radiance Archival Tape (RAT): 203 tapes, 1 tape/1 day; Inverted Profile Archival Tape (LAIPAT): 36 tapes, 1 tape/2 to 6 days; Inverted Profiles & Radiance Tapes (PROFILE-I): approx 7	NSSDC RAT & LAIPAT available at NSSDC	LIMS
IR 1.0 m band	SAM-2 NIMBUS-7	Global from 64deg N to 80deg N and from 64deg S to 80deg S; Horizonal: 1km x 250km; Vertical: 1km	10/1978 - . Full latitude coverage is obtained in 6 months	Tape - Basic radiance data (RDAT): 1 tape/1 month	NSSDC First four years available; fifth year to be archived	SAM2
IR 6.7micrometers and 11.5micrometers	THIR NIMBUS-7	Global; nadir resolution: 19.6km (6.7); 6.7km (11.5)	11/1978 - . 1 day for global coverage; 1.25 sec/ cross-track scan; 850 samples/sec	Tape - Calibrated & located radiance data (CLDT): 730 tapes/1 yr	NSSDC/PCDS Five years available at NSSDC; selected parts in PCDS	THIR

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
MICROWAVE 1.55cm (19.35 GHz)	ESMR NIMBUS-5	Global: 25km x 25km at nadir: 45km x 160km at scan extremes	12/1972 - 10/1975. 12 hrs for global coverage: 4 sec/ scan: 78 samples/ scan	Tape - Calibrated & located brightness temperature data (CBTT): 585 tapes/3 years: Raw sensor data: 1103 tapes/3 yrs Film - 70mm BW: 1 orbital swath of temperature data: 9094 orbits/2.5 yrs Paper - 8" x 10" color images: brightness temperature data: 43 selected images from 12 72 - 1/73	NSSDC Available	ESMR-5
MICROWAVE 0.81cm (37 GHz) dual polarization	ESMR NIMBUS-6	Global: 25km x 45km	06/1975 - 10/1977. 12 hrs for global coverage: horizontal polarization channel failed 9/76: 5.3 sec/ scan: 71 samples/ scan	Tape - Calibrated & located brightness temperature data (CBTT): 56 tapes/2.3 yrs. (70 orbits/1 tape): Raw sensor data: 539 tapes/2.3 yrs. (7 orbits/1 tape) Film - 70mm BW: orbital swaths of temperature data: up to 10 swaths/frame	NSSDC Available	ESMR-6

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
MICROWAVE 0.81cm - 4.55cm (37GHz-6.6GHz) in 5 discrete bands with dual polarization	SMMR NIMBUS-7	Global to 84.2deg latitude; resolution varies; elliptical IFOV varies with wavelength from 26km to 151km; rectangular cells vary from 30km to 156km; orbital swath is 780km wide	10/1978 - , 6 days for global coverage; power on 1 day of 2; all channels sampled simultaneously every 0.128 sec or 0.032 sec; 4.1 sec/ spatial scan	Tape - Atenna Temperature Tape (TAT): 1 tape/1 data day for 1st yr, 1 6250-bpi tape/3 days thereafter; calibrated brightness temperature binned into equal-area cells (CELL-ALL): 1 tape/3 data days; Raw sensor data (UFO-S): 1 tape/1 data day Film - 105mm color transparencies, polar projections of brightness temperatures (MATRIX-30): 1 map/6 day or monthly average	NSSDC Five yrs TAT, 2 yrs CELL-ALL, & 2 years MATRIX-30 available	SMMR
MICROWAVE (ACTIVE) 2.16cm (13.9 GHz)	RADAR ALTM GEOS-3	Global oceans between 65deg N and 65deg S, excluding some areas of the South Atlantic and Indian Oceans; Avg: 10km x 10km	04/1975 - 12/1978, Repeat coverage every 4 weeks; 100 observation pulses per second	Tape - All instantaneous return samples and derived parameters: 518 tapes	SDSD Available	ALTG
MICROWAVE (ACTIVE) 2.16cm (13.9 GHz)	RADAR ALTM SEASAT	Global oceans between 72deg N and 72deg S; Avg: 6km x 6km	07/1978 - 10/1978, Repeat coverage every 3 days; 1000 observation pulses per second	Tape - Contains all instantaneous return samples and ancillary data: 1000 tapes	SDSD Available	ALTS

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
MICROWAVE (ACTIVE) 23.5cm (1.275 GHz)	SAR SEASAT	Restricted to 2000km around each of 5 ground stations (4 in North America, one in England); 25m x 25m	07/1978 - 10/1978. Repeat coverage every 3 days; 1400 observation pulses per second	Tape - Contains SAR data digitally processed to yield images: 120 tapes Film - 70 mm strips; contains SAR data optically processed to yield images: 500 image strips	SDSD Available	SAR
MICROWAVE (ACTIVE) 2.05cm (14.6 GHz)	SCATTEROM SEASAT	Global oceans between 78deg N and 78deg S; 50km x 50km	07/1978 - 10/1978. Repeat coverage every 3 days; 40 observation pulses per second	Tape - Contains radar backscatter power for the 4 antennae, ancillary data, and derived parameters (GDR): 400 tapes	SDSD Available	SCAT
ULTRA-VIOLET 2555Ang - 3398Ang in 12 discrete steps; 1600Ang - 4000Ang in 1 continuous scan	BUV NIMBUS-4	Global; 200km x 200km	04/1970 - 05/1977. 6 days for global coverage; daylight only; Each discrete wavelength sampled for 1 sec, all 12 in 32 sec; Continuous scan wavelengths sampled for 80 msec each, complete scan in 112 sec	Tape - Calibrated & located radiance data (U-TAPE): 43 tapes/7 yrs; Raw sensor data (PUB): 188 tapes/7 yrs	NSSDC Available	BUV

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
ULTRA-VIOLET 2555Ang - 3398Ang in 12 discrete steps: 1600Ang - 4000Ang in 1 continuous scan	SBUV NIMBUS-7	Earth, global: 200km x 200km; sun, full disk: solar diameter	11/1978 - , 6 days for global coverage: solar disk once daily: power on 3 days of 4: daylight only; each discrete wavelength sampled for 1 sec, all 12 in 32 sec; continuous scan wavelengths sampled for 80 msec each, complete scan in 112 sec	Tape - Earth-located radiance data (RUT-S): 52 tapes/1 year; Raw sensor data: 1 tape/ 1 wk	NSSDC Four years of data available	SBUV
ULTRA-VIOLET 3125Ang - 3800Ang in 6 discrete bands	TOMS NIMBUS-7	Earth, global: 50km x 50km, varies to 200km x 200km; sun, full disk: solar diameter	11/1978 - , 1 day for global coverage: solar disk once daily: power on 3 days of 4: daylight only; all discrete wavelengths are sampled in 200 msec, which is 1 scene; cross-track scan views 35 scenes/ 8 sec	Tape - Calibrated & located radiance data (RUT-T): 156 tapes/1 year; Raw sensor data: 1 tape/ 1 wk	NSSDC Four years of data available	TOMS
UV, VISIBLE, IR 0.2 - 50 micrometers in 22 overlapping bands	ERB NIMBUS-6	Earth: Global: 2 observation modes: full disk: 121deg; spatial scan: 0.25deg x 5.12deg; sun: full disk: 10deg	07/1975 - 11/1978, Earth, 1 day for global coverage; full disk, 4 sec/ sample; scan, 1 sec/2 samples & 112 sec/scan; solar disk viewed 14 times daily: 1 sec/ scan; for 2 min/ observation	Tape - Calibrated & located radiance data (MAT): 273 tapes/1 yr, (1 tape/1 data day); calibrated solar & earth flux data (SEFDT): 1 tape/1 month	NSSDC Awaiting additional funding	ERB67

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
UV, VISIBLE, IR 0.2 - 50 micrometers in 22 overlapping bands	ERB NIMBUS-7	Earth, global: 2 observation modes: full disk, 121deg; spatial scan, 0.25deg x 5.12deg; sun, full disk: 10deg	11/1978 - . Power on 3 days of 4; Earth, 1 day for global coverage: full disk, 4 sec/1 sample: scan, 1 sec/2 samples & 112 sec/ scan: solar disk viewed 14 times daily: 1 sec/1 scan: for 2 min/1 observation	Tape - Calibrated & located radiance data (MAT): 1 1600-bpi tape/1 day for 11/78 to 10/80, 1 6250-bpi tape/3 data days after: calibrated solar & earth flux data (SEFDT): 1 1600-bpi tape/1 month	NSSDC Four years of MAT available; 2 yrs of SEFDT (5 yrs solar)	ERB67
VISIBLE 485.9 - 786.6nm in 8 discrete bands	OCE OSTA-1	Globally distributed coastal regions; 1km x 1km	11/1981 - 11/1981, Launch occured in 11/81; duration was 3 days; no repeat coverage	Tape - Calibrated upwelling radiances: 2 tapes	NSSDC Available	OCE
VISIBLE, IR 0.55 - 12.5micrometers in 4 discrete bands	AVHRR NOAA-6	Global: 3 resolutions: global area coverage, 4km: local area coverage, 1.1km: mosaics, 12.8km at equator	06/1979 - . 1 day for global coverage; 166 msec/ total scan with 52 msec earth view: 2 sampling rates: global, 1 sample/0.101 msec: local, 1 sample/0.0253 msec	Tape - Radiance data with attached calibration & location data: made to order from daily videotape archival products: mapped radiance data on mosaics: 4 images/1 day Film - 25cm: can be produced as 35mm slides: mapped radiance data on polar stereo & mercator mosaics: 4/1 day Prints - Can be produced from film	SDSD Available	AVHRR

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
VISIBLE, IR 0.55 - 12.5micrometers in 4 discrete bands	AVHRR TIROS-N	Global: 3 resolutions: global area coverage, 4km: local area coverage, 1.1km: mosaics, 12.8km at equator	10/1978 - , 1 day for global coverage: 166 msec/ total scan with 52 msec earth view: 2 sampling rates: global, 1 sample/0.101 msec: local, 1 sample/0.0253 msec	Tape - Radiance data with attached calibration & location data: made to order from daily videotape archival products: mapped radiance data on mosaics: 4 images/1 day Film - 25cm: can be produced as 35mm slides: mapped radiance data on polar stereo & mercator mosaics: 4/1 day Prints - Can be produced from film	SDSD Available	AVHRR
VISIBLE, IR 433 - 800nm in 5 discrete bands: 10.5 - 12.5um in one band	CZCS NIMBUS-7	Global coastal regions: 826m x 826m	11/1978 - , 6-day repeat cycle: 27.5 msec/observation	Tape - Calibrated Radiance and Temperature Tape (CRTT): 300 tapes/1 month Film - 241 MM BW. Calibrated radiances: 300 images/month	SDSD Three years available	CZCS
VISIBLE, IR 500 - 1100nm in 4 discrete bands	MSS LANDSAT	Global excluding poles: VIS: 79m x 79m: IR: 240m x 240m	07/1972 - , 18-day repeat cycle: 36.7msec/ observation	Tape - Calibrated digital imagery: More than 6 million images Film - Calibrated digital imagery: More than 6 million images	EROS Data Ctr Available	MSS

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
VISIBLE, IR 385 - 1000nm in 4 discrete bands	SAGE AEM-2	Global from 79deg N to 79deg S, above 10km elevation; Horizontal: 1km x 250km; Vertical: 1km	03/1979 - . Full coverage is obtained in 18 days	Tape - Meteorological, calibration, and raw data for all 4 bands; 5 tapes/month	NSSDC Available	SAGE
VISIBLE, IR 0.5 - 1.0um in visible band; 10.5 - 12.5um in IR band	SR ITOS-1	Global; VIS: 3.6km x 3.6km; IR: 7.4km x 7.4km	04/1970 - 03/1978. Full coverage is obtained daily in the visible and twice daily in the IR.	Film - Calibrated, gridded imagery; 140 images/day	SDSD Available	SR
VISIBLE, IR 0.5 - 1.0um in visible band; 10.5 - 12.5um in IR band	SR NOAA-1,2,3,4,5	Global; VIS: 3.6km x 3.6km; IR: 7.4km x 7.4km	04/1970 - 03/1978. Full coverage is obtained daily in the visible and twice daily in the IR.	Film - Calibrated, gridded imagery; 140 images/day	SDSD Available	SR
VISIBLE, IR 3.94 - 14.73um in visible and IR bands	VAS GOES-4	Between 65deg N and 65deg S, and 5deg W to 145 deg W for GOES-East, 65deg W and 155deg E for GOES-West; VIS: .9km x .9km; IR: 6.9km x 6.9km; DWELL: 13.8km x 13.8km	09/1980 - 06/1981. 16hrs/ day coverage from 1030 GMT to 0300 GMT	Tape - High density digital tape (HDDT) radiance data; computer compatible tape (CCT) radiance data	SDSD & GSFC Available	VAS

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
VISIBLE, IR 3.94 - 14.73um in visible and IR bands	VAS GOES-5	Between 65deg N and 65deg S, and 5deg W to 145 deg W for GOES-East, 65deg W and 155deg E for GOES-West; VIS: .9km x .9km; IR: 6.9km x 6.9km; DWELL: 13.8km x 13.8km	05/1981 - 07/1984, 16hrs/ day coverage from 1030 GMT to 0300 GMT	Tape - High density digital tape (HDDT) radiance data; computer compatible tape (CCT) radiance data	SDSD & GSFC Available	VAS
VISIBLE, IR 3.94 - 14.73um in visible and IR bands	VAS GOES-6	Between 65deg N and 65deg S, and 5deg W to 145 deg W for GOES-East, 65deg W and 155deg E for GOES-West; VIS: .9km x .9km; IR: 6.9km x 6.9km; DWELL: 13.8km x 13.8km	04/1983 - , 16hrs/ day coverage from 1030 GMT to 0300 GMT	Tape - High density digital tape (HDDT) radiance data; computer compatible tape (CCT) radiance data	SDSD & GSFC Available	VAS
VISIBLE, IR 0.6 - 0.7um in visible band; 10.5 - 12.5um in IR band	VHRR NOAA-2,3,4,5	Global; 0.87km x 0.87km	11/1972 - 02/1979, Full coverage is obtained daily in the visible and twice daily in the IR	Tape - Raw image data with calibration appended; 2400 tapes for last 90 days of VHRR Film - 241 mm BW; calibrated images 100 images/day	SDSD Available	VHRR
VISIBLE, IR 0.47 - 0.94um in visble band; 10.5 - 12.5um in IR band	VIRR SEASAT	Global from 75deg N to 75deg S; VIS: 2km x 2km; IR: 4km x 4km	07/1978 - 08/1978, Full coverage is obtained twice every 3 days	Film - 241 mm BW; calibrated visible and IR images; 330 images/day	SDSD Available	VIRR

Table 2-2. Summary Descriptions for Radiance Data Sets (cont.)

DATA TYPE Spectral Band Wavelengths	SOURCE Sensor Mission	SPATIAL Coverage Resolution	TEMPORAL Coverage Resolution	PRODUCTS Medium Quantity	ARCHIVE Name Status	CATALOG REFERENCE
VISIBLE, IR 0.55 - 0.75um in visible band; 10.5 - 12.6um in IR band	VISSR GOES-1,2,3,4	Pole-to-pole from 5deg W to 145deg W or 65deg W to 155deg E; VIS: 0.9km x 0.9km; IR: 8km x 8km	10/1975 - , Full coverage is obtained every half hour	Tape - Calibrated image data: Over 25,000 tapes Film - 25cm BW: calibrated images: 574 images/day Microfilm 35 mm reel: calibrated images: 1 reel/15 days	SDSD & NSSDC Available	VISSR
VISIBLE, IR 0.55 - 0.75um in visible band; 10.5 - 12.6um in IR band	VISSR SMS-1,2	Pole-to-pole from 5deg W to 145deg W or 65deg W to 155deg E; VIS: 0.9km x 0.9km; IR: 8km x 8km	07/1974 - , Full coverage is obtained every half hour	Tape - Calibrated image data: Over 25,000 tapes Film - 25cm BW: calibrated images: 574 images/day Microfilm 35 mm reel: calibrated images: 1 reel/15 days	SDSD & NSSDC Available	VISSR

END OF REPORT (9/13/84)

SECTION 3. CLIMATE PARAMETER DATA SETS

The detailed descriptions of data sets for each climate parameter are presented in alphabetical order with respect to the name of the climate parameter. Many of the entry titles also contain instrument and spacecraft identifications since, in many cases, a given parameter may have multiple sources. Climate parameter nomenclature used in this document is consistent, to the extent feasible, with that used in WMO and other documents devoted to planning the World Climate Program. This nomenclature, adapted from these sources, is summarized in Table 3-1.

Table 3-1. Climate Parameter Nomenclature

No.	Parameter
	Weather Variables
1.	Temperature Profile
2.	Surface Pressure
3.	Wind Velocity
4.	Sea Surface Temperature
5.	Humidity
6.	Precipitation
7.	Cloud Cover
8.	Boundary Layer Stability
	Ocean Parameters
4a	Sea Surface Temperature
9.	Evaporation
10.	Surface Sensible Heat Flux
11.	Wind Stress
12.	Sea Surface Elevation
13.	Upper Ocean Heat Storage
14.	Temperature Profile
15.	Velocity Profile
	Radiation Budget
7a	Clouds (Effect on Radiation)
16.	Regional Net Radiation Components
17.	Equator-Pole Gradient
18.	Surface Albedo
19.	Surface Radiation Budget
20.	Solar Constant
21.	Solar Ultraviolet Flux

No.	Parameters
	Land, Hydrology, and Vegetation
6a	Precipitation
18a	Surface Albedo
22.	Surface Soil Moisture
23.	Soil Moisture (Root Zone)
24.	Vegetation Cover (Non-Forest)
25.	Evapotranspiration
26.	Plant Water Stress
	Cryosphere Parameters
27.	Sea Ice (% Open Water)
28.	Snow (% Coverage)
29.	Snow (Water Content)
30.	Ice Sheet Surface Elevation
31.	Ice Sheet Horizontal Velocity
32.	Ice Sheet Boundary
	Atmospheric Composition
21a	Solar Ultraviolet Flux
33.	Stratospheric Aerosol Optical Depth
34.	Tropospheric Aerosol Optical Depth
35.	Ozone
36.	Stratospheric H_2O
37.	N_2O, NOx
38.	CO_2
39.	CFM's
40.	CH_4

RADIATION BUDGET FROM ERB

1 TYPE OF DATA

1.1 Parameter/Measurement. The radiation budget of the Earth is described in terms of Earth and solar radiance. For the Earth Radiation Budget (ERB) experiment on Nimbus-6 and 7, ten solar channels (labeled 1 through 10) measure incoming solar radiation. Four Earth-looking channels (11 through 14) with fixed wide-angle fields-of-view (WFOV) measure radiation from the entire visible Earth disc. Eight earth-looking scanning channels with narrow-angle fields-of-view (NFOV) measure the angular dependence of Earth radiation. Four of these channels (15 through 18) measure short wavelength (reflected) radiation, while the other four (19 through 22) measure the long wavelength (emitted) radiation. Longwave flux, earth albedo, and net radiation are derived from combinations of both the WFOV and NFOV measurements (for details see Item 3).

1.2 Unit of Measurement. W/(m**2) for solar constant, terrestrial flux, and net radiation; % for albedo.

1.3 Data Source. ERB instruments on Nimbus-6 and 7.

1.4 Data Set Identification. The data product descriptions below and under Item 8 are based on Nimbus-7; in September 1980 a program was initiated to reprocess the ERB data from Nimbus-6 to be consistent with the Nimbus-7 data, but this program was not funded to completion.

Mapped Data Matrix Tape (MATRIX), Level II and Level III

Contains daily, 6-day, and monthly world grids of data and contour map matrices for parameters.

Seasonal Average MATRIX (SAVER), Level II and Level III

Contains 3-month world grids of data and contour map matrices for parameters.

Zonal Means Tape (ZMT), Level II and Level III

Contains the tabular listings of solar irradiances, zonally averaged insolation, longitudinal and latitudinal averages of Earth flux, albedo, and net radiation.

ERB Solar Analysis Tape (ESAT), Level II

Contains five years of ERB calibrated orbital and daily averaged solar irradiance measurements, as well as several solar activity indicators (including the Zurich relative sunspot number, the Ottawa 2800 MHz Solar Flux and daily calcium plage index).

Subtarget Radiance Tape (STRT), Level II

Contains radiance data located on the subtarget area grid and placed in angular bins defined by the satellite zenith angle at the subtarget area, the sun-satellite azimuth angle, and the solar zenith angle.

2 SPATIAL CHARACTERISTICS

Spatial coverage and spatial resolution are functions of the products that are generated. The MATRIX and SAVER tape products have two basic formats: the World Grid Format and the Map Format. The spatial coverage and spatial resolution are described below.

Format	Spatial Characteristics
World grid (W.G.) format:	2070 target areas, each approximately 500 km x 500 km. Latitude interval = 4.5 degrees; longitude interval varies from 4.5 degrees at the equator to 120 degrees at the poles.
Map format:	1 Mercator and 2 polar stereographic maps. Mercator map: 32 degrees N - 32 degrees S latitude, 0-360 degrees longitude; Polar maps: Equator to pole, North and South; each polar map contains 65 x 65 grid elements.

The Zonal Means Tape products are divided into zonal averages and meridional averages. The spatial coverage and spatial resolution are described below.

Product	Spatial Characteristics
Zonal averages	Average over 4.5 degrees latitude belts (all longitudes) for latitude = 90 degrees S to 90 degrees N; products for WFOV and NFOV
Meridional averages	Average over 4.5 degrees latitude intervals by 9 degrees longitude intervals for latitude = 18 degrees N to 18 degrees S and longitude = 0 degree to 360 degrees; NFOV products only

3 TEMPORAL CHARACTERISTICS

3.1 Temporal Coverage. Coverage began with ERB-6 in July 1975 and continues with ERB-7, turned on in November 1978. The scanner mechanisms of both instruments have failed, and ERB-6 was turned off on March 2, 1981. Little ERB-6 data was recorded after October 1978. The wide field of view earth flux and solar channels of ERB-7 are still operational.

Two gaps exist for the angularly-dependent, terrestrial flux data (obtained from the scan channels). About six months of ERB-6 scan data exist, from July 1975 through January 1976, though the ERB-6 scanner data became noisy in September 1975 and the problem continued until scanning was stopped in January 1976. Then there are no data until November 16, 1978, when ERB-7 began operation. ERB-7 data continue through June 1980 (19 months of scan data). The second gap begins at that time and continues to the present. In addition, the scanner operation was limited for three months early in the Nimbus-7 mission, from December 10, 1978, to March 9, 1979. During this interval the scanner still operated, but on a reduced schedule, resulting in less scan data and in some gaps in the nighttime data over the Northern Hemisphere.

No large gaps exist for the solar data or the WFOV terrestrial flux data. From July 1975 to October 1978, the data source is ERB-6; from November 16, 1978, to the present, the data source is ERB-7. The ERB-6 data are very sparse after October 1, 1978.

The duty cycle for operation of ERB-6 was about 75 percent for the first year and 100 percent thereafter. However, after May 1976, only about 65 percent of each orbit could be recorded due to tape recorder problems. After the scan mechanism failed, the narrow angle channels continued to take data from the nadir position. ERB-7 is subject to a 75 percent duty cycle of 3 days on and 1 day off. The period of scan-limited operation mentioned above did not affect this duty cycle. The ERB-7 instrument was still powered on 3 days of 4, but the scan mechanism operated only 2 of those 3 days. Normally the scanner operated on a 3 days on/1 day off cycle also. ERB-7 operated full-time for about six months during 1984.

3.2 Temporal Resolution. The temporal resolution for the MATRIX and SAVER tape products is shown in the following table, where headings such as daily, 6-day, 1 monthly and seasonal indicate the averaging interval.

Data Products on MATRIX and SAVER

Products from WFOV	Channels Used	Daily W. G.	6-day W.G. & Map	Month W.G. & Map	3 Month W.G. Map
LW terrestrial flux					
o day	12-13	X		X	X
o night	12-13	X		X	X
o day plus night	12-13	X		X	X
Earth albedo					
o (0.2-4.0 micro-meters)	13,10c	X		X	X
o (0.7-3.0 micro-meters)	14,5	X		X	X
o (0.2-0.7 micro-meters)	13,14,5,10c	X		X	X
Net radiation	12,13,10c	X	X	X	X
Data population for WFOV observations					
o day		X		X	X
o night		X		X	X
o day plus night			X	X	X

Products from NFOV	Channels Used	Daily W. G.	6-day W.G. & Map	Month W.G. & Map	3 Month W.G. Map
LW terrestrial flux					
o day	19-22	X		X	X
o night		X		X	X
o day plus night		X		X	X
Earth albedo					
o average	15,16,17,18,10c	X		X	X
o minimum				X	X
Net radiation	15-22,10c	X	X	X	X
Data population for NFOV observations					
o day		X		X	X
o night		X		X	X
o day plus night			X	X	X

The temporal resolution for the Zonal Means Tape products is shown in the following table:

Data Products on ZMT

Products	Daily	6-day	Monthly	Season
LW terrestrial flux- day, night, & day plus night WFOV zonal NFOV zonal & meridional			X	X
Earth albedo WFOV zonal NFOV zonal & meridional			X	X
Net radiation WFOV zonal NFOV zonal & meridional		X	X	X
Mean solar irradiance (normalized to mean Sun-Earth distance) - ch. 1-10 individually	X	X	X	X
Zonally averaged insolation (W/m**2), averaged over 4.5 degrees latitude belts - ch. 2, 3, 4, 5, 10 individually	X	X	X	X

4 INSTRUMENT DESCRIPTION

Refer to entry for Earth Radiation Budget (ERB) in instrument measurement section.

Because of Nimbus-7 orbit characteristics, the ground pattern of orbits very nearly repeats at 6-day intervals (83 orbits). This 6-day interval is termed the cyclic period in ERB data descriptions.

5 DATA PROCESSING SEQUENCE

5.1 Processing Steps and Data Sets. Processing for radiation budget parameters begins with the ERB Master Archive Tape (MAT) described in the entry for ERB-6 and 7, and the cloud statistics tape CLE described under the entry "Cloud Cover from THIR".

From these two tapes NOAA prepares a special analysis for studies of the angular distribution of earth albedo designated the Subtarget Radiance Tape (STRT). The climate parameters listed in Item 3 are calculated from the MAT tapes as indicated in the table entries of Item 3, and organized on the appropriate world grids (WG) or polar stereographic or Mercator projections, as daily, 6-day, monthly, and seasonal (three-month) averages. They are written on the Zonal Means Tape (ZMT), the Mapped Data Matrix Tape (MATRIX), and the Seasonal Averages Tape (SAVER). A tape identified as TABLES is prepared to produce microfilm for the parameters on the ZMTs.

5.2 Derivation Techniques/Algorithms. As a matter of convenience in data handling, earth locations are expressed in terms of the "ERB World Grid" which divides the earth into 2070 approximately equal area grids (500 km x 500 km), and each grid into nine subtarget areas each approximately 160 km x 160 km in size. The Earth Radiation Budget products (MATRIX, SAVER, ZMT) utilize only the 2070 target area grid. The subtarget areas are used only by the STRT tapes.

Because of the sun-synchronous orbits of Nimbus-6 and 7 the radiation budget parameters derived from measurements made by the ERB instrument contain a diurnal bias. An experiment planned for 1984-87 (ERBE) is designed to better define this bias, providing a correction which could be applied to ERB MATRIX data.

5.3 Special Corrections/Adjustments. Observed solar irradiance is adjusted to the mean Sun-Earth distance on the ERB Solar Analysis Tape (ESAT). The solar irradiance measured by channel 10c is also adjusted for the incidence angle at the detector. This correction is always small. This correction is not applied to the measurements made by channels 1 through 9.

5.4 Processing Changes. A study is being conducted to assure that the data sets from ERB-6 and ERB-7 data are homogeneous and compatible.

6 QUALITY ASSESSMENT

6.1 Data Validation by Producer. Data validity is critically dependent on instrument stability and the prelaunch calibration. Annual rocket launches have been conducted to provide comparative "solar constant" data.

A quality checking program will be maintained by the ERB processing team, subject to available resources.

6.2 Confidence Level/Accuracy Judgment. The design goal for the Earth radiation budget products is 1 percent accuracy. The actual accuracy is still being determined. The performance of the Nimbus-7 total solar irradiance channel 10c is limited by the analog-to-digital converter to + or - 0.5 counts. The uncertainty due to this limitation is 0.54 W/(m**2) or about + or - 0.04 percent of the signal during the solar measurement. The channel is quite stable and the accuracy of its relative measurements may be governed by the digitization cut off. The absolute accuracy of the 10c measurements is better than 0.5 percent.

6.3 Usage Guidance. The majority of the ERB radiation budget parameters will contribute to climate parameters Regional Net Radiation Components and Equator-Pole Gradient as defined in NASA Climate Program planning. The daily solar irradiance data will contribute to the determination of the Solar Constant. In concept there is a continuous data set since June 1975.

Limitations exist, however, as to the availability and coverage of these data. For example, since the Nimbus-6 launch in 6/75, the ERB parameter extraction and data set preparation programs have undergone considerable modification. Hence, reprocessing of all past ERB-6 data through the latest versions of the algorithms is not yet complete. Furthermore on ERB-6 scanning data, the narrow angle channels will probably remain limited to just the July-August 1975 period. For ERB-7, the narrow angle data are available only between November 1979 and June 1981.

7 CONTACTS FOR DATA PRODUCTION INFORMATION

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7.2 Senior Scientist

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7.3 Experimental Products (background on STRT and angular distribution models)

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7.4 Preliminary WFOV ERB-6 Products

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8 OUTPUT PRODUCTS AND AVAILABILITY

8.1 Tape Products

8.1.1 Mapped Data Matrix Tape (MATRIX), Level II and Level III

Medium/Specification: 9-track, 1600-bpi computer tape; Nimbus Spec. No. T134031, Revision L, dated June 1984.

Format and Content: The MATRIX tapes contain regional earth radiation budget products at the top of the atmosphere. Included are emmited longwaves, albedo, and net radiation calculations on a daily, six day, and monthly basis. Separate WFOV and NFOV products are presented. The earth is divided into 2070 fixed target areas, each approximately 500 km * 500 km, and results are given for each target area viewed during a specific period. Sampling population and other statistics are given, as well as day, night, and average results. Each tape is generated by IBM 360/91 and 3081 computer programs. It contains a standard header record written twice as the first file. There are up to 14 data files numbered 2 through 15 which contain either daily world grid data or 6-day averaged data in the form of Mercator/polar map matrices, plus a data file that contains monthly averages in the world grid format and also as Mercator and polar stereographic projections. All data records contain 117,792 bits (14,724 bytes) of information.

The data files are followed by a file which contains a monthly calibration table (CAT). The last file may be a trailer documentation file defining all inputs for producing the tape.

Of the 37 ERB parameters calculated, 26 are included as daily world grid matrices. Monthly averages for all 37 ERB parameters will appear in the next to last data file. The daily files contain only world grid formatted data; the six-day files contain only Mercator/polar map matrices, and the monthly averages file contains both types of data.

All file assignments described above are based on full time operation of the ERB instrument. For those 6-day cyclic periods in which the ERB instrument is off, the total number of files on the tape will be reduced by two, but the record/file arrangement will remain the same. The NFOV records contain fill values following the scanner failure.

This tape is used to produce 32 types of maps which are described under film products.

Seasonal Average Tapes (SAVER), which are similar to MATRIX but contain three month, or seasonal averages, are also being produced. Each tape contains three months of data. DELMAT is another product which contains short-term calibration adjustment quantities to be used in MATRIX wide field-of-view calibration starting June 1980. There is one DELMAT per month.

Data Quantity/Rate: There will be 12 MATRIX tapes/year, 1 DELMAT tape/month starting with year three, and 1 SAVER tape/3 months.

Status: MATRIX tapes are available at the archive for the first three Nimbus-7 data years. Two years of SAVER tapes are available, and year 2 of the DELMATs is available.

Plans/Schedule: Year 4 MATRIX tapes should be available soon. Other MATRIX, DELMAT, and SAVER tapes will be available in late 1984 or early 1985.

8.1.2 Zonal Means Tape (ZMT), Level II and Level III

Medium/Specification: 9-track, 1600-bpi computer tape; Nimbus Spec. No. T134091 Revision E, dated December 16, 1983.

Format and Content: Each data file will cover one month and will contain scientific data listings. Data files 3 and 6 will also contain seasonal averages. These listings for five basic displays are available in each data file and over several time periods. The type of measurements and the time periods covered are shown by the list in Item 8.2.1. The following quantities are found on this tape:

Type 1, for the tables of mean solar irradiance and zonally averaged insolation.

Type 2, for all longitudinal averages.

Type 3, for net radiation or Earth albedo from NFOV channels.

Type 4, for terrestrial flux (NFOV and WFOV) and earth albedo from WFOV channels.

Type 5, for the monthly status and calibration summary data.

Data Quantity/Rate: Each tape will contain a minimum of 6 months of data, for two tapes per year.

Status: The two years of data are available.

Plans/Schedule: Year 3 through 5 will be archived in late 1984.

8.1.3 ERB Solar Analysis Tape (ESAT), Level II

Medium/Specification: 9-track, 1600-bpi computer tape

Format/Specification: The ESAT contains five years of ERB calibrated orbital and daily averaged solar irradiance measurements. For the same time period it also contains several solar activity indicators. These include the Zurich relative sunspot number, the Ottawa 2800 Mhz Solar Flux, and the daily calcium plage index. The tape consists of five files. When the tape is made available, a user's guide will also be available.

Data Quantity/Rate: One 1600-bpi tape.

Status: The tape will be archived in late 1984.

Plans/Schedule: No additional plans.

8.1.4 Subtarget Radiance Tape (ERB-STRT), Level II

Medium/Specification: 9-track, 6250-bpi computer tape.

Format and Content: The ERB STRT tape is generated at NOAA for use in developing angular dependence models of reflection and emission. ERB scanning channel radiances and associated information are sorted into the 2070 target areas (TA). Each area is further divided into a 3 x 3 array of subtarget areas (STA), 160 km x 160 km. Within each STA the satellite derived information is grouped by orbit and sorted by time and viewing angle.

The data for each day are contained on the tape in the following types of logical record:

1. topography records - 1 per TA
2. geography records - 1 per STA
3. observation records - 1 per STA per orbit

All records have information to identify TA and STA location, date and time of observation.

The topography record consists of climatological information for each TA. It specifies the fraction of the TA containing: 1) water and permanent ice for each of the four seasons; 2) six other surface configurations - plains, hilly uplands and plateaus, mountains, and deserts of the hamada, erg, and mountain and bolson types; 3) nine vegetation classifications - mountains, forests of the selva, scrub, taiga, and mixed mid-latitude types, grasslands of the savanna and prairie (steppe) types, tundra, and desert.

Each geography record contains the fraction of land, water, snow and ice present in a STA within 24 hours of the ERB measurements. Also, the average depth (mm) of the snow and average age (days) of the snow and ice are given.

The topography and geography records both consist of ancillary data obtained from non-ERB sources, specifically P.E. James' "A Geography of Man" and the U.S. Air Force snow and ice data tape.

Each observation record contains all the radiances observed in a STA during one orbital pass of the satellite. Each radiance is assigned a bin number corresponding to satellite zenith angle and azimuth angle relative to the sun (the upward facing hemisphere is divided into 389 discrete bins each about 6 degrees in zenith and 15 degrees in azimuth angle).

Included is the fraction (in ninths) of the field-of-view located in the STA, the number of the channel from which the radiance value is derived, and computed minimum, mean and maximum solar zenith angle. Estimates of the amount and type of low, middle and high clouds covering each STA (obtained from the CLE (THIR) described in entry "Cloud Cover from THIR") within ten minutes of the ERB radiance observations are provided.

A file is marked on the tape when all 2070 TAs have been processed for one day. Generally nine files will be on one tape.

Data Quantity/Rate: There will be one 6250-bpi tape for every 6-day period. There is a potential of 388 data days (11/16/78 to 6/22/80), but only 272 data days will be included in the first archive data set which covers slightly more than one year of data.

Status: 46 tapes are available from NSSDC.

Plans/Schedule: More data days may be included to be archived in data set.

8.2 Film Products

8.2.1 MATRIX and SAVER MAPS, Level II and III

Medium/Specification: 35 mm reels of positive microfilm.

Format and Content: The ERB data are displayed on 27 different map sets. All parameters are computed and displayed at monthly and 3-month intervals. Some are also computed and displayed at 6-day, or shorter, intervals.

All map displays contain a north and a south polar stereographic projection (pole to equator for each) and a Mercator projection (to +/- 32 degrees). Immediately beneath each Mercator map is contouring information giving the contour units, interval between contour lines, and the maximum and minimum value contoured.

All map displays contain an indicator of the quantity of data within a display. On 6-day displays there is a "missing orbits per day" code specifying how many orbits of data are missing from each day's input to the map. On the 1-month and 3-month maps there is an "on-off cycle" scale specifying the days during the display period when the instrument was on and off.

One northern hemisphere and one southern hemisphere polar stereographic map are at the top with a Mercator map immediately below. The Mercator map (with an equatorial scale equal to the equatorial scale of the polar maps) provides overlapping (and redundant) coverage between the two polar maps. Title and reference information at the bottom are mostly self-explanatory. Included in the reference information are identification numbers for the physical tape on which the data are stored, the algorithm used in processing the data, the specific film product, the project data format code, and the film frame. The only number of interest to the user is the specification number of the particular film product. The number specifies the parameter being mapped and the time interval over which it is being mapped. A listing of each map title and its identification number follows:

L. W. TERRESTRIAL FLUX FROM WFOV OBSERVATIONS - ASCENDING NODE
133701 One-month Average

L. W. TERRESTRIAL FLUX FROM WFOV OBSERVATIONS - DESCENDING NODE
133702 One-month Average

L. W. TERRESTRIAL FLUX FROM WFOV OBSERVATIONS - ASCENDING NODE AND DESCENDING NODE
133703 One-month Average

DATA POPULATION OF WFOV OBSERVATIONS - ASCENDING NODE
133704 One-month Average

DATA POPULATION OF WFOV OBSERVATIONS - DESCENDING NODE
133705 One-month Average

EARTH ALBEDO FROM WFOV OBSERVATIONS (0.2 to 4.0 micro-meters)
133707 One-month Average
133807 Three-month Average

EARTH ALBEDO FROM WFOV OBSERVATIONS (0.7 to 3.0 micro-meters)
133708 One-month Average
133808 Three-month Average

EARTH ALBEDO FROM WFOV OBSERVATIONS (0.2 to 0.7 micro-meters)
133709 One-month Average
133809 Three-month Average

NET RADIATION FROM WFOV OBSERVATIONS
133410 Six-day Average
133710 One-month Average
133810 Three-month Average

L.W. TERRESTRIAL FLUX FROM NFOV OBSERVATIONS - ASCENDING NODE
133711 One-month Average
133811 Three-month Average

L.W. TERRESTRIAL FLUX FROM NFOV OBSERVATIONS - DESCENDING NODE
133712 One-month Average
133812 Three-month Average

L.W. TERRESTRIAL FLUX FROM NFOV OBSERVATIONS - ASCENDING AND DESCENDING NODE
133713 One-month Average
133813 Three-month Average

L. W. DATA POPULATION OF WFOV OBSERVATIONS - ASCENDING AND DESCENDING NODE
133406 Six-day Totals
133706 One-month Totals
133806 Three-month Totals

S. W. DATA POPULATION OF NFOV OBSERVATIONS - ASCENDING NODE
133714 One-month Totals
133814 Three-month Totals

S. W. DATA POPULATION OF NFOV OBSERVATIONS - DESCENDING NODE
133715 One-month Totals
133815 Three-month Totals

L. W. DATA POPULATION OF NFOV OBSERVATIONS - ASCENDING NODE
133728 One-month Average

L. W. DATA POPULATION OF NFOV OBSERVATIONS - DESCENDING NODE
133729 One-month Average

L. W. DATA POPULATION OF NFOV OBSERVATIONS - ASCENDING AND DESCENDING NODE
133416 Six-day Totals
133716 One-month Totals
133816 Three-month Totals

EARTH ALBEDO FROM NFOV OBSERVATIONS
133717 One-month Average
133817 Three-month Average

MINIMUM EARTH ALBEDO FROM NFOV OBSERVATIONS
133718 One-month Period
133818 Three-month Period

NET RADIATION FROM NFOV OBSERVATIONS
133419 Six-day Average
133719 One-month Average
133819 Three-month Average

NORMALIZED DISPERSION OF L.W. TERRESTRIAL FLUX FROM WFOV OBSERVATIONS - ASCENDING AND DESCENDING NODE
133721 One-month Average

NORMALIZED DISPERSION OF EARTH ALBEDO FROM WFOV OBSERVATIONS
133722 One-month Average

NORMALIZED DISPERSION OF NET RADIATION FROM WFOV OBSERVATIONS
133723 One-month Average

NORMALIZED DISPERSION OF L.W. TERRESTRIAL FLUX FROM NFOV OBSERVATIONS - ASCENDING AND DESCENDING NODE
133724 One-month Average

NORMALIZED DISPERSION OF EARTH ALBEDO FROM NFOV OBSERVATIONS
133725 One-month Average

NORMALIZED DISPERSION OF NET RADIATION FROM NFOV OBSERVATIONS
133726 One-month Average

STANDARD DEVIATION OF NET RADIATION FROM NFOV OBSERVATIONS
133726 One-month Average

EARTH ALBEDO FROM WFOV OBSERVATIONS (0.2 to 4.0 micro-meters) WITH SOLAR ZENITH ANGLE CORRECTION
133727 One-month Average

In ordering maps from the archive, maps may be requested by name or number. If by name, the averaging interval must be included in the title. The maps are sent to the user in weekly reels of film, each reel containing all maps produced during that week.

Data Quantity/Rate: There are 436 MATRIX maps produced per year, or one set microfilm per month. SAVER MAPS are produced at a rate of 1 set per season.

Status: Experimental; current products are for review by ERB Experiment Team and ERB Processing Team.

Plans/Schedule:

8.2.2 TABLES, Level III

Medium/Specification: 16 mm reels of positive microfilm.

Format and Content: The ERB tables provide numerical parameter information for latitude zones, or meridional sections of the world for some of the mapped parameters.

A listing of each table and its specification number follows:

MEAN NORMALIZED SOLAR IRRADIANCE (and) ZONALLY AVERAGED INSOLATION

136160 One-day Average
136460 Six-day Average
136760 One-month Average
136860 Three-month Average

NET RADIATION FROM WFOV OBSERVATIONS (Meridional)

136461 Six-day Mean Zonal Average
136761 One-month Meridional Average
136861 Three-month Mean Zonal Average

NET RADIATION FROM NFOV OBSERVATIONS (Meridional)

136462 Six-day Variation-Latitude Belts
136762 One-month Variation-Latitude Belts
136862 Three-month Variation-Latitude Belts

TERRESTRIAL FLUX FROM WFOV OBSERVATIONS

136763 One-month Mean Zonal Average
136863 Three-month Mean Zonal Average

TERRESTRIAL FLUX FROM NFOV OBSERVATIONS (Meridional)

136764 One-month Daytime
136764 One-month Nighttime
136764 One-month Day Plus Night
136864 Three-month Daytime
136864 Three-month Nighttime
136864 Three-month Day Plus Night

EARTH ALBEDO FROM WFOV OBSERVATIONS

136765 One-month Mean Zonal Average
136865 Three-month Mean Zonal Average

EARTH ALBEDO FROM NFOV OBSERVATIONS (Meridional)

136766 One-month Variations
136866 Three-month Variations

MONTHLY STATUS AND CALIBRATION SUMMARY

136767

NET RADIATION FROM NFOV OBSERVATIONS (Zonal)

136468 Six-day Average
136768 One-month Average
136868 Three-month Average

EARTH ALBEDO FROM NFOV OBSERVATIONS (Zonal)

136769 One-month Average
136869 Three-month Average

TERRESTRIAL FLUX FROM NFOV OBSERVATIONS (Zonal)

136770 One-month Average
136870 Three-month Average

Data Quantity/Rates: There are 718 TABLES produced per year, or one set of microfilm per month.

Status: Film products have been processed from November 16, 1978, to October 31, 1979.

9 DATA ACCESS

9.1 Archive Identification

Code 633/Central Data Services Facility
National Space Science Data Center
Goddard Space Flight Center
Greenbelt, Maryland
(301) 344-6695

9.2 Procedures for Obtaining Data. Prospective users should request a copy of "NSSDC and WDC-A-R&S Document Availability and Distribution Services," May 1974.

Researchers who reside outside the USA should direct their requests to:

World Data Center A for Rockets and Satellites
Code 630.2
Goddard Space Flight Center
Greenbelt, Maryland 20771 USA
(301) 344-6695

Users may request data by letter, telephone, or personal visit. Charges depend upon affiliation and sponsorship of user program. Data are free to NASA users. Personal communication with NSSDC personnel before ordering is advised.

9.3 PCDS Status/Plans. PCDS provides access to ERB-MATRIX, ERB-ZMT, and SEFDT. Plans are being made to support ERB-SEASONAL AVERAGES (ERB-SAVER) and the ERB Solar Analysis Tape (ESAT).

10 CONTACTS FOR ARCHIVE/DATA ACCESS INFORMATION

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11 REFERENCES

11.1 Satellite/Instrument/Data Processing Documentation

a. GSFC, 1975. The Nimbus-6 User's Guide. NASA/GSFC. Greenbelt, Maryland.

b. GSFC, 1978. The Nimbus-7 User's Guide. NASA/GSFC. Greenbelt, Maryland.

c. Hurley, E.J. and R. Jones, December 1983. Nimbus-7: Observing the Atmosphere and Oceans. NASA/GSFC. Greenbelt, Maryland.

d. Hurley, E.J., A.J. Fleig, P.A. Barba, 1984. Nimbus-7 Data Product Summary. NASA/GSFC. Greenbelt, Maryland.

11.2 Journal Articles and Study Reports

a. Curran, Robert J., 1980. "Satellite Measurements of Earth Radiation Budget for Climate Applications." Space Shuttle, Dawn of an Era, Volume 41, Advances in the Astronautical Sciences.

b. Hickey, J.R., L.L. Stowe, H. Jacobowitz, P. Pellegrino, R.H. Maschhoff, F. House, and T.H. Vonder Haar, April 1980. "Initial Solar Irradiance Determinations from Nimbus-7 Cavity Radiometer Measurements." Science 208:281-283.

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d. Jacobowitz, H., and R.J. Tighe, June 30, 1984. "The Earth Radiation Budget Derived from the Nimbus-7 ERB Experiment", Journal of Geophysical Research 89:4997-5010.

e. Jacobowitz, H., H.V. Soule, H.L. Kyle, F.B. House, and the Nimbus-7 Experiment Team, June 30, 1984. "The Earth Radiation Budget Experiment: An Overview", Journal of Geophysical Research 89:5021-5038.

f. Smith, G.L. and T.D. Bess, 1982. "Annual Cycle and Spatial Spectra of Earth Emitted Radiation at Large Scales", Journal of the Atmospheric Sciences 40:998-1015.

g. Stowe, L.L. et al, 1980. "A Unique Data Base for Studying Reflectance and Emittance Characteristics of Earth and Cloud Surfaces," Preprints, International Radiation Symposium, August 1980, Ft. Collins, Colorado.

h. Rasche, E., ed., 1978. "Terminology and Units of Radiation Quantities and Measurements." International Association of Meteorology and Atmospheric Physics (IAMAP) Radiation Commission, NCAR, Boulder, Colorado.

i. Taylor, V.R., and L.L. Stowe, June 30, 1984. "Reflectance Characteristics of Uniform Earth and Cloud Surfaces Derived from Nimbus-7 ERB", Journal of Geophysical Research 89:4987-4996.

11.3 Archive/DBMS Usage Documentation.

a. NOPS, August 1983. ERB MATRIX Year 1 Data Validation Document. NASA/GSFC. Greenbelt, Maryland.

b. NOPS, July 1984. ERB TABLES/ZMT Data User's Guide. NASA/GSFC. Greenbelt, Maryland.

c. NSSDC, May 1974. "NSSDC and WDC-A-R&S Document Availability and Distribution Services."

d. Stowe, L.L. and M.D. Fromm, December 1983. Nimbus-7 ERB Sub-target Radiance Tape (STRT) Data Base. NOAA Technical Memorandum NESDIS 3. NOAA/NESDIS, Washington, D.C.

12 RELATED DATA SETS

Continuity is planned with the Earth Radiation Budget Experiment (ERBE) on the ERBS, NOAA-F and NOAA-G spacecraft in the 1984-87 time period.

13 SUMMARY/SAMPLE

Sample map and table products are available.

14 NOTES

SECTION 4. RADIANCE MEASUREMENT DATA SETS

The individual detailed descriptions for each radiance measurement data set are presented in alphabetical order with respect to the name of the satellite instrument or experiment as abbreviated in the identification code at the top outer corner of each page.

EARTH RADIATION BUDGET (ERB) EXPERIMENT

1 TYPE OF DATA

1.1 Parameter/Measurement. Earth and solar radiances in the ultraviolet, visible and infrared are measured in 22 bands with characteristics listed in the table that follows:

Nimbus-6 and Nimbus-7 ERB Instrument Characteristics

Channel		Wavelength Limits (micro-meters)		Accuracy
Solar	1	0.2 - 3.8	SW Irradiance	0.02 W/(m**2)
Channels	2	0.2 - 3.8	SW Irradiance	0.02 W/(m**2)
	3	< 0.2 - >50	Total Irradiance	0.01 W/(m**2)
	4	0.526 - 2.8	Ind. Spectral Region	0.02 W/(m**2)
	5	0.698 - 2.8	Ind. Spectral Region	0.02 W/(m**2)
	6	0.395 - 0.508	Ind. Spectral Region	0.04 W/(m**2)
	7	0.344 - 0.460	Ind. Spectral Region	0.06 W/(m**2)
	8	0.300 - 0.410	Ind. Spectral Region	0.08 W/(m**2)
	9	0.275 - 0.360	Ind. Spectral Region	0.01 W/(m**2)
	10*	< 0.2 - >50	Ind. Spectral Region	0.02 W/(m**2)
Fixed WFOV	11	< 0.2 - >50	Total Irradiance	0.007 W/(m**2)
Channels	12	< 0.2 - >50	Total Irradiance	0.007 W/(m**2)
	13	0.2 - 3.8	SW Reflected	0.007 W/(m**2)
	14	0.695 - 2.8	SW Reflected	0.007 W/(m**2)
Scanning	15	0.2 - 4.8	SW Reflected	0.00004 W/(cm**2)/sr
NFOV	16	0.2 - 4.8	SW Reflected	0.00004 W/(cm**2)/sr
	17	0.2 - 4.8	SW Reflected	0.00004 W/(cm**2)/sr
	18	0.2 - 4.8	SW Reflected	0.00004 W/(cm**2)/sr
	19	4.5 - 50.0	LW Emitted	0.00002 W/(cm**2)/sr
	20	4.5 - 50.0	LW Emitted	0.00002 W/(cm**2)/sr
	21	4.5 - 50.0	LW Emitted	0.00002 W/(cm**2)/sr
	22	4.5 - 50.0	LW Emitted	0.00002 W/(cm**2)/sr

* A UV channel (0.252-0.324 micro-meters) on Nimbus-6 was replaced on Nimbus-7 by a self-calibrating cavity detector designated channel 10c and covering all wavelengths.

Please note that these values are more accurate than those in the Nimbus-6 User's Guide.

1.2 Unit of Measurement. Flux in W/(m**2). Albedo in percent.

1.3 Data Source. The Earth Radiation Budget (ERB) experiments on Nimbus-6 and Nimbus-7.

1.4 Data Set Identification. Data are archived on two sets of tapes identified as Master Archive Tape (MAT) and Solar and Earth Flux Data Tape (SEFDT). Brief descriptions of both types follow.

Master Archive Tape (MAT), Level 1

Contains calibrated and raw digital data values for all channels, plus values of temperature monitoring, orbit, attitude, and solar incidence angle data.

Solar and Earth Flux Data Tape (SEFDT), Level 1

Contains up to 30 days of solar data (Channels 1 through 10) and earth flux data (Channels 11 through 14) stripped from the MAT.

2 SPATIAL CHARACTERISTICS

2.1 Spatial Coverage. The spatial coverage differs with the channel, as described below.

Solar Channels: As the satellite crosses over the Antarctic, just before it starts its northward trip on the daylight side of the earth, the entire solar disk is viewed within the unencumbered field of 10 channels. This field is the one for which the entire sun is contained in the receiver FOV.

Wide-Angle Channels: These four channels continuously view the entire earth disc. The measurements are continuous over the entire globe.

Narrow-Angle Channels: These eight scanning channels are designed to obtain a large number of angularly independent views of the same geographical area as the entire globe is covered.

2.2 Spatial Resolution. The spatial resolution also differs with the three types of channels. The solar channels have a 10-degree FOV, which observes only the solar disk with no resolution of solar features. The wide angle channels have a 130 degrees FOV, which is slightly larger than that required to view the entire earth disk. This corresponds to a circular footprint on the earth of about 6300 km diameter. The narrow angle channels have a 0.25 degree x 5.12 degree rectangular FOV, which at nadir corresponds to an area of 4 km x 85 km.

3 TEMPORAL CHARACTERISTICS

3.1 Temporal Coverage. Coverage began with ERB-6 in July 1975 and is still continuing with ERB-7, turned on in November 1978. The scanner mechanisms of both instruments have failed, but the fixed earth flux and solar channels of both are still operational, although since November 1978 only ERB-7 data are routinely recorded.

Two gaps exist for the angularly-dependent, terrestrial flux data (obtained from the scan channels). About six months of ERB-6 scan data exist, from July 1975 through January 1976. Then there are no data until November 16, 1978, when ERB-7 began operation. ERB-7 data continue through June 1980 (19 months of scan data). The second gap begins at that time (the scanner failed on June 22, 1980) and continues to the present. In addition, the scanner operation was limited for three months early in the Nimbus-7 mission, from December 10, 1978, to March 9, 1979. During this interval the scanner still operated, but on a reduced schedule, resulting in less scan data and in some gaps in the nighttime data over the Northern Hemisphere.

No large gaps exist for the solar data or the WFOV terrestrial flux data. From July 1975 to October 1978, the data source is ERB-6; from November 1978 to the present, the data source is ERB-7. One small data gap in the ERB-7 data occurred when, for approximately two weeks in late January and early February 1979, the Nimbus-7 duty cycle was altered to accommodate other instruments of its payload, resulting in no ERB-7 operation at all for those days.

The duty cycle for routine operations of ERB-6 was 100 percent. Although the scan mechanism had failed, the narrow angle channels continued to take data from the nadir position. ERB-7 is subject to a 75 percent duty cycle of 3 days on and 1 day off. The period of scan-limited operation did not affect the duty cycle. The ERB-7 instrument was still powered on 3 days of 4; the scan mechanism operated only 2 of these 3 days.

3.2 Temporal Resolution. For the narrow-angle channels, the ERB has five different scan modes of operation. Scan modes 1, 2, 3, and 4 obtain a maximum number of angularly independent views of a given geographical area. When the instrument is in one of these four modes of operation, the scan pattern is repeated every 112 seconds or every 717 km along the subtrack point. Scan mode 5, which is the mode of operation used to obtain maximum Earth coverage, is repeated every 224 seconds or every 1434 km along the subpoint track.

Each of the 8 NFOV channels is sampled 2 times per second, the 4 WFOV channels are sampled once per second. For the Solar Channels, the sun is viewed at sunrise over the South Pole for about 3 minutes each orbit that the instrument is on. These solar measurements are each averaged to 1 value per orbit.

4 INSTRUMENT DESCRIPTION

4.1 Mission Objectives. The objectives of the Earth Radiation Budget (ERB) experiment are

(1) to determine over a period of a year, the earth radiation budget on both synoptic and planetary scales by simultaneous measurement of:

a. Incoming solar radiation

b. Outgoing earth-reflected shortwave and earth emitted long wave radiation by:

(i) Fixed wide-angle sampling of these terrestrial fluxes at the satellite altitude.

(ii) Scanned narrow-angle sampling of the angular radiance components.

(2) to develop angular models of the reflection and emission of radiation from clouds and Earth surfaces.

4.2 Key Satellite Flight Parameters. Nominal orbit parameters for Nimbus-6 are listed below.

o	Launch date	June 12, 1975
o	Planned duration	1 year
o	Actual duration	Still operating
o	Orbit	Near polar, sun-synchronous, circular
o	Semi-major axis	7480.28 km
o	Nominal altitude	1102 km
o	Inclination	99.956 degrees
o	Nodal period	107.31 min
o	Equator crossing time	1200 Local Mean Solar Time, ascending

Nominal orbit parameters for Nimbus-7 are listed below.

o	Launch date	October 24, 1978
o	Planned duration	1 year
o	Actual duration	Still operating
o	Orbit	Near polar, sun-synchronous, circular
o	Semi-major axis	7333.155 km
o	Nominal altitude	955 km
o	Inclination	99.28 degrees
o	Nodal period	104.159 min
o	Equator crossing time	1200 Local Mean Solar Time, ascending

4.3 Principles of Operation. The Earth Radiation Budget (ERB) experiment is designed to provide highly accurate (1 percent or better) radiation measurements of the Sun and Earth from which the terrestrial radiation budget can be determined on both synoptic and planetary scales. A special goal of the experiment is to provide data related to the angular distribution of Earth albedo. For solar measurements each of the 10 channels is an independent, individually replaceable modular element with a mated amplifier. The sensors are advanced versions of the Eppley-JPL thermopiles. There are no imaging optics, only filters, windows and apertures.

Earth emitted infrared radiation, and earth reflected solar radiation are measured with fixed, wide angle field-of-view sensors. The wideband channels (11 and 12) employ a type N3 thermopile with circular receiver. Channel 13 is similar to a precision pyrometer; channel 14 has a broadband filter hemisphere to match the band of channel 5.

The eight scanning channels are mounted in a cylindrical head which is gimbal mounted on the mainframe of the radiometer unit. The gimbal arrangement allows the pointing direction of the scan head to be varied within a vertical plane by rotation of the scan head, and within a horizontal plane by rotation of the gimbal. With this arrangement the same portion of Earth can be viewed from different directions, thus providing data for modeling the angular distribution of the earth albedo.

4.4 Instrument Measurement Geometry. The viewing geometry varies with the type of channel. For the wide field-of-view channels, the four sensors have unencumbered fields of 121 degrees and maximum fields of 133.3 degrees. From the orbital altitude of 955 km for Nimbus-7 , the earth subtends an angle of 120.8 degrees, corresponding to a circle of 29.6 degrees radius on the earth. For Nimbus-6 which has an orbital altitude of 1100 km, the earth subtends an angle of 120.2 degrees corresponding to a circle of 29.9 degrees radius on the earth. Channel 12 has an insertable stop so that, upon command it can view slightly less than the entire earth surface. The geographic coordinates of the center of the field-of-view are stored as the location of the measurement.

For the scanning channels, the cylindrical head contains the four telescopes aligned such that the telescope center lines are 12 degrees apart when projected onto the horizontal plane. The fields-of-view (FOVs) of four telescopes are rectangular, 0.25 degree by 5.12 degrees, the FOVs of the short wavelength channels (15-18) are coincident, respectively, with those of the long wavelength channels (19-22) (one telescope contains 1 short wave and 1 long wave channel). The telescope scan head can be scanned fore and aft and to each side of the subsatellite track. Five scan patterns are available, the difference between modes being the sequence and number of directions taken by the scan head. The scan modes are commanded by the operations center, and selected by the Sensor Scientist.

5 DATA PROCESSING SEQUENCE

5.1 Processing Steps and Data Sets. The User Formatted Output (UFO) tape, the Image Location Tape (ILT), and calibration data are merged and processed into two Level I products: the Master Archive Tapes (MAT) and the Solar and Earth Flux Data Tapes (SEFDT). The UFO contains telemetry and primary sensor data. The ILT contains IFOV location data, spacecraft ephemeris and attitude data, time corrections, and bit slip information.

5.2 Derivation Techniques/Algorithms. The measurements made by most of the twenty-two channels are data of primary interest. Each detector can be calibrated by either on-board reference targets, the sun or space. In-flight calibration of the main solar channels on Nimbus-7 may be referred to Channel 10c, a self-calibrated channel using the cavity heater activated by the GO/NC GO heater command. In addition the degradation of Channel 2 is checked by the occasional exposure of its duplicate, Channel 1. Channels with filters do not have a direct method of optically checking their calibration but must rely on correlations made with the main channels.

5.3 Special Corrections/Adjustments. Investigations are continually being made which would confirm and supplement the in-flight calibrations and assist in establishing the validity of the ERB measurements. Efforts are also continuing to document the history of the ERB instrument calibrations, so that they are available for users of the data, and to assess the instrument stability.

5.4 Processing Changes. There are studies underway to design the processing which will assure the homogeneity of the ERB-6 and ERB-7 data sets. New wide field of view calibration optimization algorithms had to be developed following the failure of the scanner channels.

6 QUALITY ASSESSMENT

6.1 Data Validation by Producer. ERB NET members have devoted a great deal of time and effort to the definition of a set of investigations and analyses for establishing the validity of the ERB measurements.

Validation of the Solar Channels: Rocket flights, managed by Charles Duncan of GSFC, were made concurrently with operation of the ERB instruments on Nimbus-6 and Nimbus-7.

The rocket and the instruments it carries are identical to the rocket flown by Duncan in 1976 for the Nimbus-6 ERB, fully described in the report by Duncan et al., "Rocket Calibration of the Nimbus-6 Solar Constant Measurements."

The solar constant was measured by the cavity radiometers on the rocket, and the result compared with the observations by the duplicate ERB and the Nimbus-7 ERB channels, as well as the Nimbus-6 ERB observations. The rocket data are also used in analysis of all the solar channels.

The ERB-7 channel 10c data were compared to sensor data from the Solar Maximum Mission (SMM) and the Active Cavity Radiometer (ACRM).

6.2 Confidence Level/Accuracy Judgment. The design goals are listed in Item 1.1. The actual accuracy will be published in a report.

6.3 Usage Guidance. The solar observations are of prime interest in studies of solar variability. The principal applications of the ERB-6 and ERB-7 data are the derived products described in the entry "Radiation Budget from ERB (RB/EN67)" of this catalog. The scanning channel data are primarily for updating an existing model of the angular distribution of the Earth albedo and for regional (500 km x 500 km) earth radiation budget studies.

7 CONTACTS FOR DATA PRODUCTION INFORMATION

7.1 Nimbus Experiment Team Chairman

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7.2 Senior Scientist

Dr. Herbert Jacobowitz
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7.3 Experimental Products (background on STRT and angular distribution models)

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7.4 Preliminary WFOV ERB-6 Products

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(804) 865-2977

8 OUTPUT PRODUCTS AND AVAILABILITY

The following data are for ERB-7; detailed plans for ERB-6 are under study.

8.1 Tape Products

8.1.1 UFO-E, User Formatted Output tape-ERB, Level 0

Medium/Specification: 9-track, 1600-bpi computer tape. Nimbus Spec. No. T113011, Revision C dated January 11, 1978.

Format and Content: This tape is generated on a CDC-3200 computer. It contains a standard header record, written twice as the first file. Each subsequent file contains data for one data orbit (a data

orbit is defined as beginning at a descending node and ending at the following descending node). All data are in order of ascending time. Each file contains 25 physical records of telemetry and primary sensor data.

Data Quantity/Rate: There are 256 seconds worth of telemetry and primary sensor data in each physical record. There are 25 records per orbit and 95 orbits per tape, or 40 tapes per year.

Status: The processing of ERB-6 data can be regarded as a development effort for the processing of ERB-7 data. The present ERB-6 data set is regarded as experimental and has not been archived. A plan is being developed to reprocess it for consistency with Nimbus-7 data. Archiving of ERB-7 data is usually complete 4 to 6 months after obtaining from the satellite. These products are not routinely made available for public access. See data producer for additional information.

Plans/Schedule: Archiving is usually complete 4 to 6 months after data acquistion.

8.1.2 Master Archive Tape (MAT), Level I

Medium/Specification: 9-track, 1600-bpi or 6250-bpi computer tape. Nimbus Spec. No. T134081 Revision D dated April 7, 1980.

Format and Content: This tape is generated on IBM 360/91 amd 3081 computers. The first file contains the Standard Header record written twice. The subsequent files contain 1 to 3 days of data and are in order of ascending time. The data are calibrated and earth located. Measurements of all channels are in orbital sequence. The tape contains some statistics such as minimum, mean, maximum and standard deviation as well as spacecraft attitude, scanner pointing angles, solar azimuth and distance, calibration factors and housekeeping information. The last file of a MAT tape may be a trailer documentation file.

Data Quantity/Rate: There is one 1600-bpi MAT per data day for the first and second data years (November 1978 - October 1980). From year three on, there are three data days per 6250-bpi tape.

Status: There are 255 data days in the first Nimbus-7 year, 269 in the second, 276 in the third, and 274 in the fourth. The first four years of data are available.

Plans/Schedule: Year five is to be available in late 1984, year six in mid-1985.

3.1.3 Solar and Earth Flux Data Tape (SEFDT), Level I

Medium/Specification: 9-track, 1600-bpi computer tape. Nimbus Spec. No. T134021 Revision H dated September 1982.

Format and Content: This tape is generated on IBM 360/91 and 3081 computers. It contains a NOPS Standard Header written twice as the

first file. The second file contains solar and earth flux data stripped from the MAT (Item 8.1.2). There are 3 different types of logical records written. The earth flux logical records contain 32 seconds of data. The solar data logical records contain 16 seconds of data, and at the end of a data orbit a solar data summary logical record is written. All logical records are sized identically. Earth flux data are located, and in orbital sequence.

The third file contains an ERB Documentation Summary Record. The last file is a trailer documentation file containing information about input used to create the tape. This file is terminated by a double end of file.

Interim SEFDTs containing optimized solar data are archived after the scanner failure. The earth irradiance data on these tapes are identical to the Earth irradiance data on the MATs. These tapes are being replaced with tapes containing both optimized solar and Earth irradiance data. The final SEFDTs contain calibrated earth flux data similar to those used for ERB-MATRIX tapes.

Data Quantity/Rate: There is one tape per month.

Status: The first five years of data are available. Two years of the optimized data are available.

Plans/Schedule: Year six data are to be available in mid-1985. The year 3, 4, and 5 interim SEFDTs will be replaced with tapes containing both optimized solar and Earth irradiance data in late 1984.

9 DATA ACCESS

9.1 Archive Identification.

Code 633/Central Data Services Facility
National Space Science Data Center
Goddard Space Flight Center
Greenbelt, Maryland 20771
(301) 344-6695

9.2 Procedures for Obtaining Data. Prospective users should request a copy of "NSSDC and WDC-A-R&S Document Availability and Distribution Services," May 1974.

Researchers who reside outside the USA should direct their requests to:

World Data Center A for Rockets and Satellites
Code 630.2
Goddard Space Flight Center
Greenbelt, Maryland 20771 USA
(301) 344-6695

Users may request data by letter, telephone, or personal visit. Charges depend upon affiliation and sponsorship of user program. Data are free to NASA users. Communication with NSSDC personnel before ordering is advised.

9.3 PCDS Status/Plans. The PCDS provides access to the Nimbus-7 ERB SEFDT data set, as well as several Level II and Level III ERB products.

10 CONTACTS FOR ARCHIVE/DATA ACCESS INFORMATION

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11 REFERENCES

11.1 Satellite/Instrument/Data Processing Documentation

a. GSFC, 1975. The Nimbus-6 User's Guide. NASA/GSFC. Greenbelt, Maryland.

b. GSFC, 1978. The Nimbus-7 User's Guide. NASA/GSFC. Greenbelt, Maryland.

c. Hurley, E.J. and R. Jones, December 1983. Nimbus-7: Observing the Atmosphere and Oceans. NASA/GSFC. Greenbelt, Maryland.

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11.2 Journal Articles and Study Reports

a. Curran, Robert J., 1980. "Satellite Measurements of Earth Radiation Budget for Climate Applications." Space Shuttle, Dawn of an Era, Volume 41, Advances in the Astronautical Sciences.

b. Hickey, J.R., L.L. Stowe, H. Jacobowitz, P. Pellegrino, R.H. Maschhoff, F. House, and T.H. Vonder Haar, April 1980. "Initial Solar Irradiance Determinations from Nimbus-7 Cavity Radiometer Measurements." Science 208:281-283.

c. Hickey, J.R., B.M. Alton, F.J. Griffin, H. Jacobowitz, P. Pellegrino, R.H. Maschhoff, E.A. Smith, and T.H. Vonder Haar, 1982. "Extraterrestrial Solar Irradiance Variability: Two and One-half Years of Measurements from Nimbus-7", Solar Energy 29:125-127.

d. Jacobowitz, H., and R.J. Tighe, June 30, 1984. "The Earth Radiation Budget Derived from the Nimbus-7 ERB Experiment", Journal of Geophysical Research 89:4997-5010.

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f. Smith, G.L., and T.D. Bess, 1982. "Annual Cycle and Spatial Spectra of Earth Emitted Radiation at Large Scales", Journal of the Atmospheric Sciences 40:998-1015.

g. Rasche, E., ed., 1978. "Terminology and Units of Radiation Quantities and Measurements." International Association of Meteorology and Atmospheric Physics (IAMAP) Radiation Commission, NCAR, Boulder, Colorado.

h. Taylor, V.R., and L.L. Stowe, June 30, 1984. "Reflectance Characteristics of Uniform Earth and Cloud Surfaces Derived from Nimbus-7 ERB", Journal of Geophysical Research 89:4987-4996.

11.3 Archive/DBMS Usage Documentation. Available from NSSDC.

a. Ray, S.N., R.J. Tighe, S.A. Scherrer, April 1984. User's Guide for ERB-7 SEFDT, volume I and II. NASA CR 170618. NASA/GSFC. Greenbelt, Maryland.

b. Vasanth, K.L., April 1984. User's Guide for ERB-7 SEFDT, volume III. NASA CR 170616. NASA/GSFC. Greenbelt, Maryland.

12 RELATED DATA SETS

See Radiation Budget (ERB) entry in the Climate Parameter section of this catalog.

13 SUMMARY/SAMPLE

There are no hardcopy products available for Level 0 and Level 1 data.

14 NOTES

GLOSSARY

AEM	Application Explorer Mission
AFGWC	Air Force Global Weather Central
AIDS	Aircraft Integrated Data System
AIREPS	Aircraft Reports
APT	Automatic Picture Transmission
ASDAR	Aircraft to Satellite Data Relay
AVHRR	Advanced Very High Resolution Radiometer
BANAT	Beta and Aerosol Number Density Archival Tape
bpi	Bits Per Inch
B/W Film	Black/White Film
BSHT (THIR)	Bit Slip History Tape
BUV	Backscatter Ultraviolet (Satellite Instrument)
CBTT	Calibrated Brightness Temperature Tape
CDA	Command and Data Acquisition (station)
CELL-ALL	Remapped Equal-Size Cells (tape)
CLDT	Calibrated Located Data Tape
CLE	Clouds-ERB (tape)
CLOUDS-ILT	Image Location Tape-Clouds
CPFL	Compressed Profile Ozone (tape)
CTOZ	Compressed Total Ozone (tape)
CZCS	Coastal Zone Color Scanner
DBMS	Data Base Management System
DMD	Digital Multiplexer Device
DPFL	Detailed Profile Ozone (tape)
DSAS	Digital Solar Aspect Sensor
DTOZ	Detailed Total Ozone (tape)
EBCDIC	Extended Binary Coded Decimal Interchange Code
ECMWF	European Center for Medium Range Forecasts (United Kingdom)
EDIS	Environmental Data and Information Service
EOF	End-of-File
ERB	Earth Radiation Budget (Instrument)
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
ESMR	Electrically Scanning Microwave Radiometer
FGGE	First GARP Global Experiment (Now Global Weather Experiment)
FNOC	Fleet Numerical Oceanographic Central
FNWC	Fleet Numerical Weather Central (Now FNOC)
FOV	Field-of-View
GAC	Global Area Coverage
GARP	Global Atmospheric Research Program
GDPS	WWW Global Data Processing System
GEOS	Geodynamics Experimental Ocean Satellite
GFDL	Geophysical Fluid Dynamic Laboratory
GLAS	Goddard Laboratory for Atmospheric Sciences
GMSF	Goddard Modeling and Simulation Facility
GMT	Greenwich Mean Time
GOES	Geostationary Operational Environmental Satellite
GOSSTCOMP	Global Operational Sea Surface Temperature Computation
GSFC	Goddard Space Flight Center

GTS	Global Telecommunications System
GWE	Global Weather Experiment
HIRS	High Resolution Infrared Radiation Sounder
ICSU	International Council of Scientific Unions
IF	Intermediate Frequency
IFOV	Instantaneous Field-of-View
ILT	Image Location Tape
IOP	Intensive Observing Period (1-month period of GWE, part of SOP)
IR	Infrared
JPL	Jet Propulsion Laboratory
KWBC	Call Letters - Worldwide Climate and Weather Center
Level 0	Raw telemetry data
Level I	Data which have been calibrated into engineering units (e.g., radiances, brightness temperatures) and located with respect to time, orbit and attitude.
Level II	Climate parameters (e.g., sea surface temperature, soil moisture) at full spatial and temporal resolution.
Level III	Climate parameters spatially and temporally averaged.
LIMS	Limb Infrared Monitor of the Stratosphere (Satellite Instrument)
LMST	Local Mean Solar Time
MAT	Master Archival Tape
MATRIX	Mapped Data Matrix Tape
MAP-LO	Mapped Parameters of Land-Ocean Data (tape)
MAP-SS	Mapped Parameters of Sea Ice and Snow and Ice on Land (tape)
MAP-30	Mapped Parameters of 37 GHz channel Data (tape)
MW	Microwave
MSU	Microwave Sounding Unit
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCDC	National Climatic Data Center
NESDIS	National Environmental Satellite Data and Information Service
NESS	National Environmental Satellite Service
NET	Nimbus Experiment Team
NFOV	Narrow Field-of-View
NMC	National Meteorological Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOPS	Nimbus Observation Processing System
NSSDC	National Space Science Data Center
NWS	National Weather Service
OSTA	Office of Space and Terrestrial Applications
OZONE-S	Ozone Tape - SBUV
OZONE-T	Ozone Tape - TOMS
PARM-LO	Parameters of Land - Ocean (tape)
PARM-SS	Parameters of Sea Ice, Snow, and Ice on Land (tape)
PARM-30	Parameters of 37 GHz channel (tape)
PDB	Primary Data Base (tape)
RUT-S	Raw Units Tape - SBUV
RUT-T	Raw Units Tape - TOMS
SAGE	Stratospheric Aerosol and Gas Experiment
SAM II	Stratospheric Aerosol Measurement II (Satellite Instrument)

C-7

SBSOSDC	Space-based and Special Observing System Data Center
SBUV	Solar Backscatter Ultraviolet (Satellite Instrument)
SDSD	Satellite Data Services Division
SEFDT	Solar and Earth Flux Data Tape
SFSS	Satellite Fire Surveillance Service
SOP	Special Observing Period (2-month period of GWE)
SMMR	Scanning Multichannel Microwave Radiometer
SST	Sea Surface Temperature
SSU	Stratospheric Sounding Unit
SR	Scanning Radiometer
Sr	Steradian
STAGS	Subtarget-Area Geographical - Season (tape)
TAT	Antenna Temperature Tape
TBM	(Ampex) Terabit Memory
THIR	Temperature-Humidity Infrared Radiometer
TIROS-N	Television and Infrared Observation Satellite, N Series
TOMS	Total Ozone Mapping Spectrometer (Satellite Instrument)
TOVS	TIROS Operational Vertical Sounder
TWOS	Tropical Wind Observing Ship
UFO	User Formatted Output (tape)
USAF	United States Air Force
U-TAPE	U-values (counts) Tape
UV	Ultraviolet
VAS	VISSR Atmospheric Sounder (Satellite Instrument)
VHRR	Very High Resolution Radiometer
VIP	Versatile Information Processor
VISSR	Visible and Infrared Spin Scan Radiometer (Satellite Instrument)
WDC-A	World Data Center-A (Meteorology-USA)
WDC-B	World Data Center-B (Meteorology-USSR)
WDC-A-R&S	World Data Center A for Rockets and Satellites
WFOV	Wide Field-of-View
WG	World Grid (tape format)
WMC	World Meteorological Center
WMO	World Meteorological Organization
WSMR	White Sands Missile Range
WWW	World Weather Watch
ZMT	Zonal Means Tape

ARCHIVE INDEX

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